

حمل الآن

مجانا وحصريا

امتحانات رقم (1)

الترم الثاني



MODEL EXAM No (1)

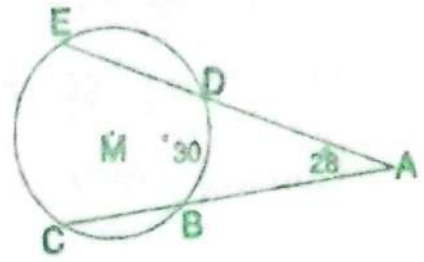
[Q1] A) Choose the correct answer:

(1) In the opposite figure:

$$\overrightarrow{ED} \cap \overrightarrow{CB} = \{A\}, m(\widehat{DB}) = 30^\circ$$

$$M(\angle A) = 28^\circ, \text{ then } m(\widehat{EC}) = \dots^\circ$$

- a) 56 b) 30 c) 86 d) 28



(2) If $AB = 6$ cm, then circumference of smallest circle passing through A, B = Cm

- a) 3π b) 6π c) 8π d) 9π

(3) If ABCD is cyclic quadrilateral, $m(\angle A) - m(\angle C) = 60^\circ$, then $m(\angle C)$

- a) 60° b) 120° c) 240° d) 360°

[B] In the opposite figure:

A circle M of radius $2\sqrt{3}$, $BC = 6$ cm

Find $m(\angle A)$, $m(\angle BCD)$

**[Q2] A) Choose the correct answer:**

(1) M, N, L are three touching externally circles two by two, their radii 5, 6, 4 cm then perimeter of $\triangle MNL = \dots$ cm

- a) 15 b) 30 c) 40 d) 60

(2) The length of arc opposite to central angle of measure 120° in a circle of radius r is

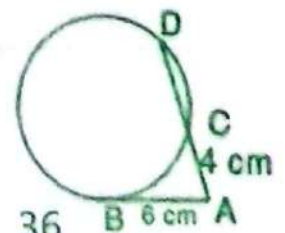
- a) $\frac{1}{3}\pi r$ b) πr c) $\frac{2}{3}\pi r$ d) $3\pi r$

(3) **In the opposite figure:**

$\overline{AB}$ is tangent, $AB = 6$ cm,

$AC = 4$ cm Then $CD = \dots$ cm

- a) 5 b) 9 c) 12 d) 36

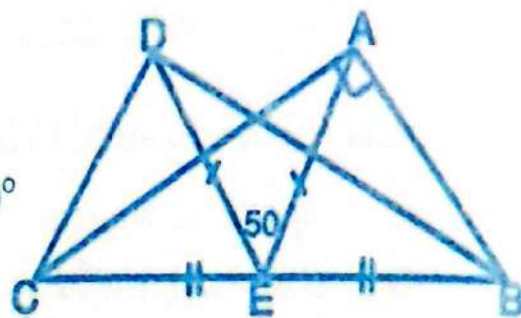


[B] In the opposite figure:

$$EB = EC, AE = ED$$

$$m(\angle AED) = 50^\circ, m(\angle BAC) = 90^\circ$$

Find $m(\angle ABD)$



[Q3]

[A] Choose the correct answer:

(1) A chord of 8 cm in a circle of diameter 10 cm, then its distance from center Cm

- a) 1 b) 2 c) 3 d) 4

(2) Number of axes of symmetry of two touching internally circles is.....

- a) Zero b) 1 c) 2 d) 3

(3) ABCD is a cyclic quadrilateral, $m(\angle A) = 2 m(\angle C)$, then $m(\angle A) = \dots\dots\dots^\circ$

- a) 35 b) 55 c) 140 d) 220

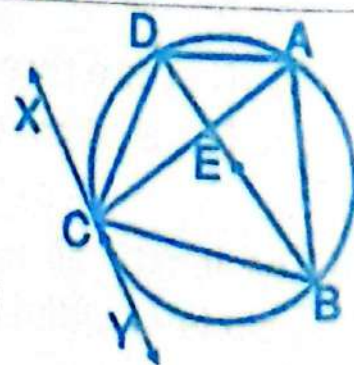
[B] In the opposite figure:

ABCD is quadrilateral is drawn in circle

Its diagonals intersect at E,

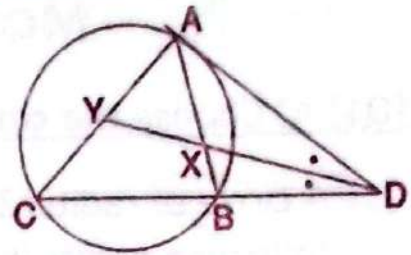
Draw $\overleftrightarrow{XY}$ tangent to circle at C where $\overleftrightarrow{XY} \parallel \overline{BD}$

Prove that: $\overline{BC}$ is tangent to circle passing through vertices of $\triangle ABE$



[Q4]**[A] In the opposite figure:**

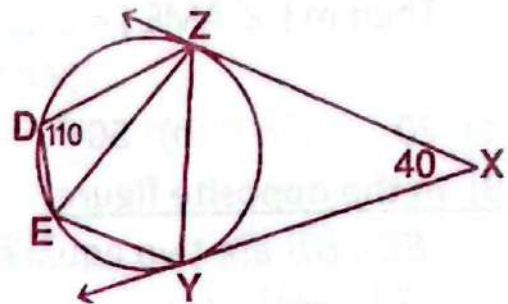
$\overrightarrow{DA}$ is tangent at A, $\overrightarrow{DY}$ bisects $\angle ADC$
 Prove that: $\triangle AXY$ is isosceles triangle



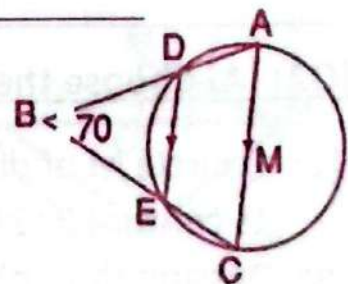
- [B] ABCD is quadrilateral, $m(\angle A) = 7X$, $m(\angle B) = 4X - 30^\circ$
 $m(\angle C) = 2X$, $m(\angle D) = 5X + 30^\circ$,
 Prove that ABCD is cyclic quadrilateral.

[Q5]**[A] In the opposite figure:**

$\overrightarrow{XY}$, $\overrightarrow{XZ}$ are two tangents,
 $m(\angle YXZ) = 40^\circ$, $m(\angle ZDE) = 110^\circ$,
 Prove that $ZE = ZY$

**[B] In the opposite figure:**

$\overline{AC}$ is diameter in circle M,
 $\overline{DE} \parallel \overline{AC}$, $m(\angle B) = 70^\circ$, Find $m(\widehat{DA})$



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 End of the questions

MODEL EXAM NO (2)

[Q1] A) Choose the correct answer:

(1) A circle of radius 3 cm and its center is origin point, which of the following points lies on the circle?

- a) $(\sqrt{5}, 0)$ b) $(2, \sqrt{5})$ c) $(1, \sqrt{3})$ d) $(1, 3)$

(2) Number of circles which passing through three collinear points is

- a) Zero b) 1 c) 3 d) Infinite

(3) In the opposite figure:

$$m(\angle C) = 30^\circ, m(\angle B) = 20^\circ$$

$$\text{Then } m(\angle AME) = \dots\dots\dots^\circ$$



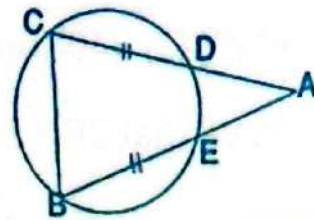
- a) 20 b) 50 c) 100 d) 120

[B] In the opposite figure:

$\overline{EC}, \overline{DB}$ are two equal chords

$$\overline{DB} \cap \overline{CE} = \{A\}$$

Prove that: $AD = AE$



[Q2] [A] Choose the correct answer:

(1) A circle M of diameter $(2X+5)$ cm, straight line L is distant from its center $(X+2)$ cm, $X > 0$, then L iscircle

- a) Outside the b) Tangent to c) Secant to d) Axis of the

(2) If AB is diameter in circle M, $\overline{AC}, \overline{BD}$ are two tangents, then ACBD

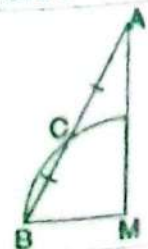
- a) Intersect b) Parallel c) Perpendicular d) Coincide

(3) In the opposite figure:

A quarter circle of center M,

C is midpoint of $\overline{AB}$, Then $m(\angle A) = \dots\dots\dots^\circ$

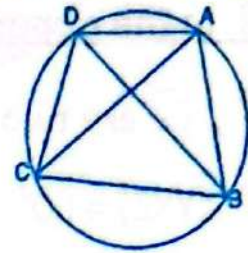
- a) 20 b) 30 c) 45 d) 60



[B] In the opposite figure:

$$AC = DB, AB = (3X - 5) \text{ cm}$$

$$DC = (x + 3) \text{ cm, find length of } \overline{AB}$$



[Q3] [A] Choose the correct answer:

(1) If the longest chord in a circle is 12 cm, its circumference =

- a) 6π b) 12π c) 24π d) 144π

(2) The radius of two circles M, N are 6 cm, 8 cm and $MN = 14$ cm, then the two circles are

- a) Intersecting b) Distant
c) One inside other d) Touching externally

(3) The inscribed angle in half circle is

- a) Acute b) Straight c) Right d) obtuse

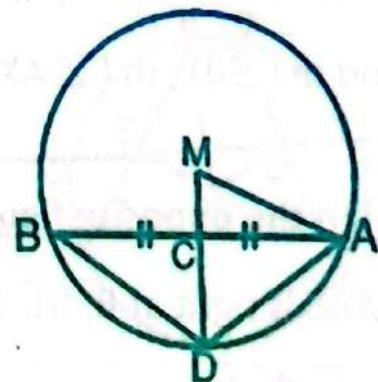
[B] In the opposite figure:

A circle M of radius 13 cm,

$\overline{AB}$ is chord of length 24 cm,

C is midpoint of $\overline{AB}$, $\overrightarrow{MC} \cap \text{circle} = \{D\}$.

Find by proof area of $\triangle ADB$



[Q4]

[A] ABCD is a square, $\overrightarrow{AX}$ bisects $\angle BAC$ and cut $\overline{BD}$ in X, $\overrightarrow{DY}$ bisects $\angle CDB$ and cut $\overline{AC}$ in Y, prove that:

- ① AXYD is cyclic quadrilateral
② $m(\angle AYX) = 45^\circ$

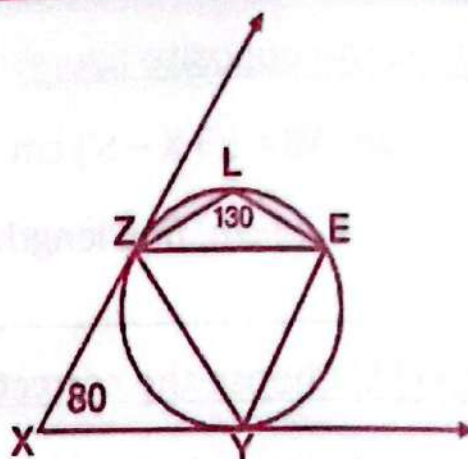
[B] In the opposite figure:

$\overrightarrow{XY}$, $\overrightarrow{XZ}$ are two tangents to circle at Y, Z

$m(\angle YXZ) = 80^\circ$, $m(\angle ELZ) = 130^\circ$

Prove that: ① $ZE = ZY$

② $\overrightarrow{XZ} \parallel \overrightarrow{EY}$



[Q5]

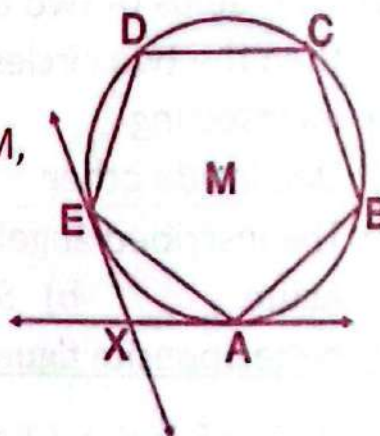
[A] In the opposite figure:

ABCDE is regular pentagon is drawn in circle M,

$\overrightarrow{AX}$ is tangent at A, $\overrightarrow{EX}$ is tangent at E

Where $\overrightarrow{AX} \cap \overrightarrow{EX} = \{X\}$,

Find $m(\widehat{EA})$, $m(\angle AXE)$

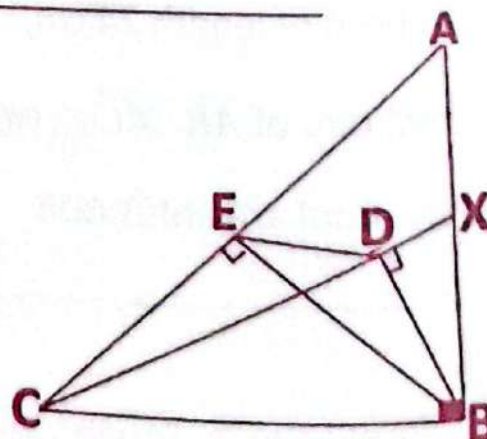


[B] In the opposite figure:

$\triangle ABC$ is right at B, $\overline{BE} \perp \overline{AC}$, $\overline{BD} \perp \overline{XC}$

Prove that:

AXDE is cyclic quadrilateral $\square$



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End of the questions

MODEL EXAM NO (3)

[Q1]

[A] Choose the correct answer:

(1) The ratio between the measure of inscribed angle and the central angle are subtended by same arc equals

- a) 1 : 2 b) 2 : 1 c) 1 : 1 d) 1 : 3

(2) If M, N are two circles are touching externally their radii 2 cm , 4 cm respectively, then the circumference of circle whose diameter $\overline{MN}$ equals cm

- a) 4π b) 6π c) 8π d) 12π

(3) ABCD is cyclic quadrilateral, $m(\angle A) = 2m(\angle B) = 5m(\angle C)$, then the $m(\angle D) = \dots\dots\dots^\circ$

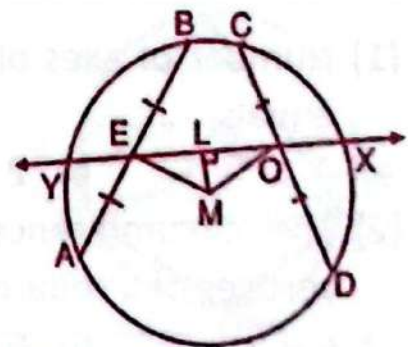
- a) 30 b) 75 c) 105 d) 150

[B] In the opposite figure:

$\overline{AB}$, $\overline{CD}$, are two equal chords in the circle M,

O is midpoint of $\overline{CD}$, E is midpoint of $\overline{AB}$,

$\overline{ML} \perp \overline{XY}$, Prove that: $OX = EY$

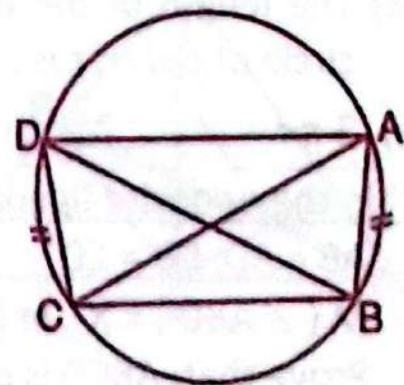


[Q2]

[A] In the opposite figure:

$$m(\widehat{AB}) = m(\widehat{CD})$$

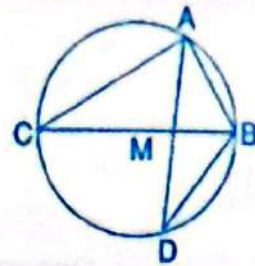
Prove that: $\overline{AD} \parallel \overline{BC}$



[B] Choose the correct answer:

- (1) If $\overline{BC}$ is diameter in circle M,
And its radius r , if $AB = r$, then
 $m(\angle D) = \dots\dots\dots^\circ$

a) 30 b) 45 c) 50 d) 60



- (2) A circle M of diameter 8 cm, if line L is outside the circle, then
the distant between the center M and line L $\in \dots\dots\dots$

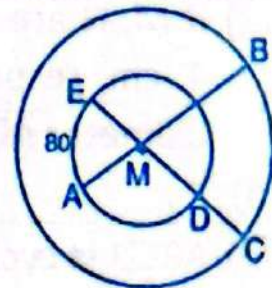
a) $]4, \infty[$ b) $[0, 4[$ c) $]0, 4[$ d) $[0, 4]$

- (3) In the opposite figure:

Two concentric circles M,

$$m(\widehat{EA}) = 80^\circ$$

$$\text{Then } m(\widehat{CB}) = \dots\dots\dots^\circ$$



a) 40 b) 60 c) 80 d) 160

[Q3] [A] Choose the correct answer:

- (1) Number of axes of symmetry of two touching externally circles equals

a) 4 b) 2 c) 1 d) Infinite

- (2) The circumference of circle in which passing through the vertices of a square whose side 6 cm equals

a) $6\sqrt{2}\pi$ b) 6π c) $12\sqrt{2}\pi$ d) 12π

- (3) The length of the arc is opposite to a central angle of 90° in a circle of radius r is cm

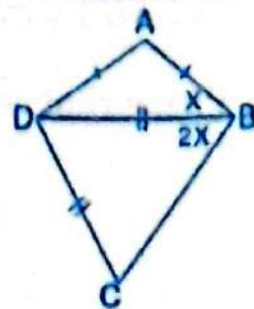
a) $2\pi r$ b) πr c) $\frac{1}{2}\pi r$ d) $4\pi r$

[B] In the opposite figure:

$$AB = AD, DB = CD$$

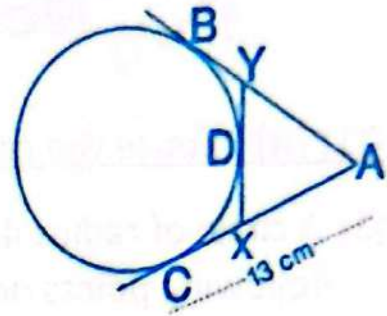
$$m(\angle ABD) = X^\circ, m(\angle CBD) = (2X)^\circ$$

Prove that: ABCD is cyclic quadrilateral



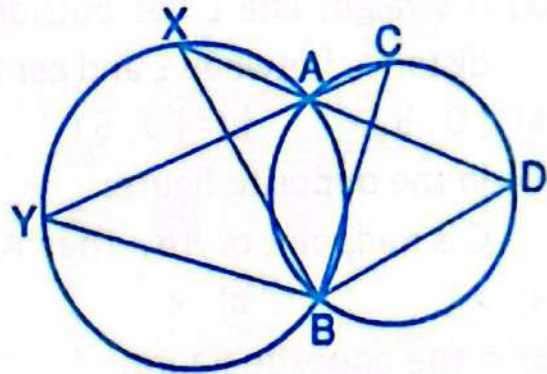
[4] [A] In the opposite figure:

$\overline{AB}$, $\overline{AC}$ are two tangent to the circle
At B, C respectively, $\overline{XY}$ are tangent
to the circle at D, $AC = 13$ cm
Find the perimeter of $\triangle AXY$



[B] In the opposite figure:

Two intersecting circles
 $\overline{AC}$ cut the smaller circle at C
And cut greater circle at Y
 $\overline{AD}$ cut the smaller circle at D
And cut greater circle at X
Prove that:
 $m(\angle CBD) = m(\angle XBY)$

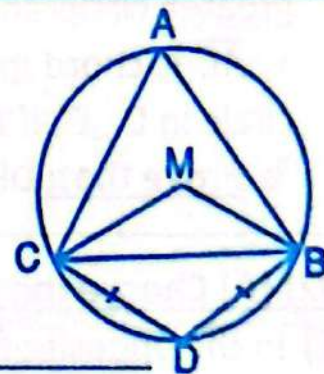


[5] [A] In the opposite figure:

$$m(\angle BMC) - m(\angle A) = 50^\circ,$$

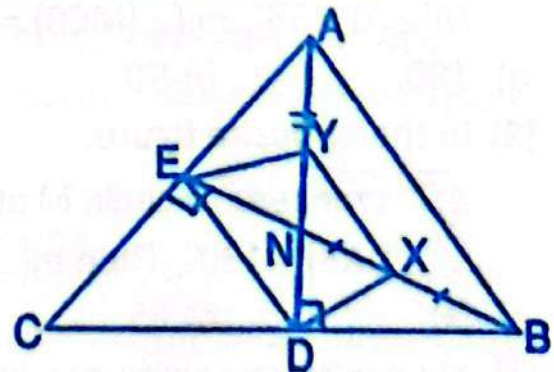
$$BD = CD,$$

Find $m(\angle A)$, $m(\angle DBC)$



[B] In the opposite figure:

$\triangle ABC$, $\overline{AD} \perp \overline{BC}$, $\overline{BE} \perp \overline{AC}$
X is midpoint of $\overline{BN}$,
Y is midpoint of $\overline{AN}$,
Prove that:
XYED is cyclic quadrilateral



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End of the questions

MODEL EXAM NO (4)

[Q1] [A] Choose the correct answer:

(1) A circle of radius 4 cm and its center is origin point, which of the following points not belong to the circle?

- a) (0, 4) b) (4, 0) c) (0, -4) d) (4, 4)

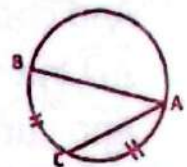
(2) If straight line L lies outside circle of diameter 10 cm, and the distance between L and center of circle is X, then $X \in \dots\dots$

- a) [0, 5] b)]0, 5[c) [0, 5[d)]5, ∞ [

(3) In the opposite figure:

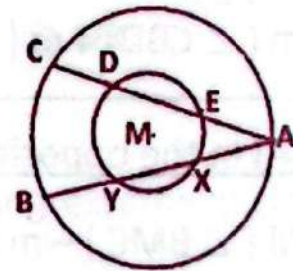
C is midpoint of $\widehat{AB}$, Then $AB \dots 2 AC$

- a) > b) < c) $\geq$ d) =

**[B] In the opposite figure:**

Two concentric circles at M, $\overline{AB}$ is chord in greater circle and cut smaller circle at X, Y, $\overline{AC}$ is chord in greater circle cut smaller circle in D, E, if $AB = AC$

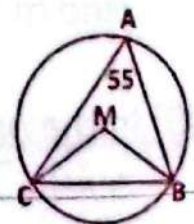
↳ **Prove that:** $DE = XY$

**[Q2] [A] Choose the correct answer:**

(1) In the opposite figure:

$m(\angle A) = 55^\circ$, $m(\angle MCB) = \dots\dots\dots^\circ$

- a) 180 b) 90 c) 100 d) 110

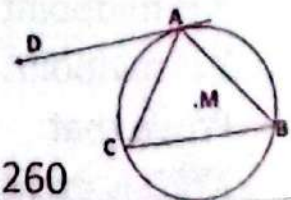


(2) In the opposite figure:

$\overline{AD}$ is tangent to circle M at A,

$m(\angle DAB) = 130^\circ$, Then $m(\angle C) = \dots\dots\dots^\circ$

- a) 50 b) 65 c) 130 d) 260



(3) We can't draw circle passing through vertices of

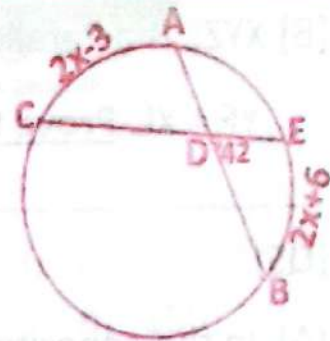
- a) Parallelogram b) Square c) Rectangle d) Isosceles trapezium

[B] In the opposite figure:

$$\overline{AB} \cap \overline{EC} = \{D\}, m(\angle EDB) = 42^\circ$$

$$m(\widehat{EB}) = (2X + 6)^\circ, m(\widehat{AC}) = (3X - 2)^\circ$$

Find the value of C?



[Q3] [A] Choose the correct answer:

(1) Sum of the interior angles of the cyclic quadrilateral is°

- a) 90 b) 180 c) 360 d) 720

(2) The length of the arc whose opposite to half circle =

- a) $2\pi r$ b) πr c) $\frac{1}{2}\pi r$ d) $\frac{1}{3}\pi r$

(3) If ABCDEF is a regular hexagon drawn inside a circle, then

$$m(\widehat{AB}) = \dots\dots\dots^\circ$$

- a) 60 b) 90 c) 180 d) 360

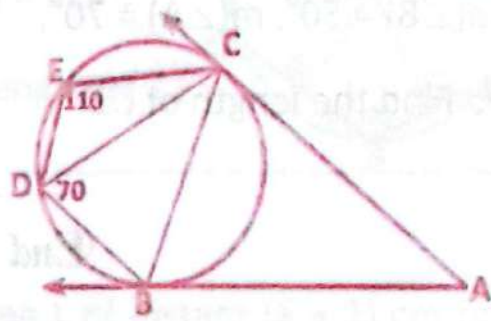
[B] In the opposite figure:

$\overline{AB}$, $\overline{AC}$ are two tangents at B, C

$$m(\angle E) = 110^\circ, m(\angle BDC) = 70^\circ$$

Prove that:

- ① $\overline{BC}$ bisects $\angle ABD$
- ② $\overline{CD}$ is tangent to circle passes through vertices of $\triangle ABC$



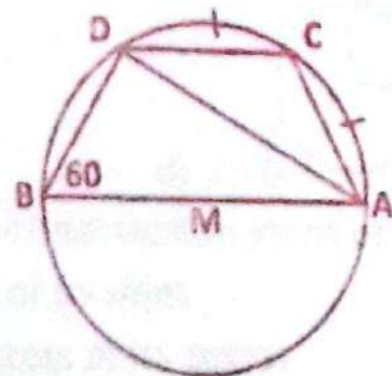
[4] [A] In the opposite figure:

ABCD is cyclic quadrilateral, $\overline{AB}$ is diameter

$$\text{in circle M, } m(\angle B) = 60^\circ$$

$$\text{Length of } \widehat{AC} = \text{length of } \widehat{CD}$$

Prove that: $\overline{AD}$ bisects $\angle BAC$



[B] XYZL is a Parallelogram, $\angle X$ is acute angle, $F \in \overrightarrow{ZL}$, $F \notin \overline{ZL}$ where $YF = XL$. **Prove that** XYLF is cyclic quadrilateral.

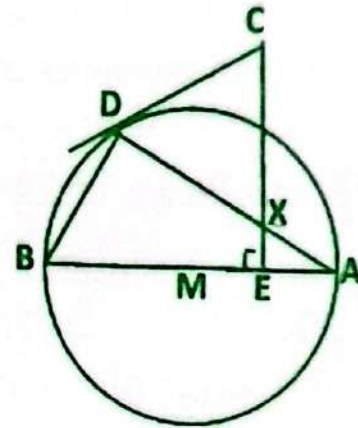
[Q5]

[A] In the opposite figure:

$\overline{AB}$ is diameter in circle M,

$\overline{CD}$ is tangent to circle D

If $\overline{CE} \perp \overline{AB}$, prove that: $CX = CD$

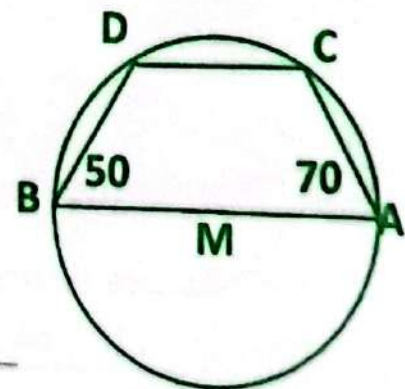


[B] In the opposite figure:

$\overline{AB}$ is diameter in circle M, its radius is 5 cm,

$m(\angle B) = 50^\circ$, $m(\angle A) = 70^\circ$,

Find the length of $\overline{CD}$



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End of the questions

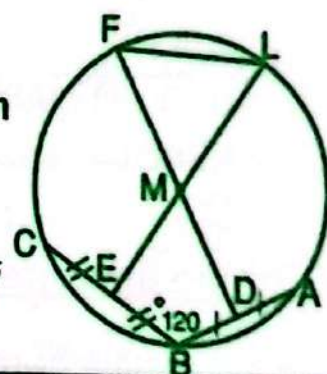
MODEL EXAM No (5)

[Q1] A) Choose the correct answer:

- (1) If ABCD is square drawn in a circle, then $m(\widehat{AB}) = \dots\dots\dots^\circ$
 a) 60 b) 90 c) 120 d) 180
- (2) Number of common tangent for two touching internally circles is
 a) 1 b) 2 c) 3 d) Zero
- (3) Center of all circles passes through two points A, B lies on
 a) $\overline{AB}$ b) Axis of $\overline{AB}$
 c) Midpoint of $\overline{AB}$ d) Perpendicular on axis of $\overline{AB}$

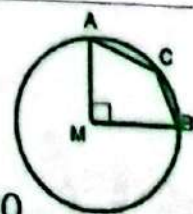
B): In the opposite figure:

$\overline{AB}$, $\overline{AC}$ are two chords in circle M of radius 7 cm
 , D, E midpoints of $\overline{AB}$, $\overline{AC}$, $m(\angle BAC) = 120^\circ$,
 Draw $\overline{DM}$, $\overline{EM}$ cut circle in F, L find length of $\overline{LF}$



[Q2] A) Choose the correct answer:

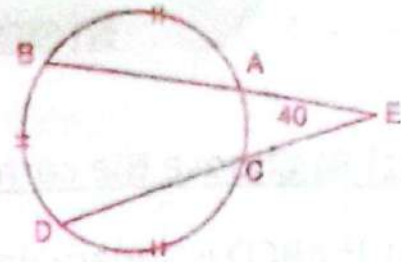
- (1) Circle of area $X\pi \text{ cm}^2$, straight line L of distant $(X + 1)$ cm from its center, then L lies Circle
 a) Outside the b) Secant of c) Tangent of d) Axis of
- (2) In the opposite figure:
 $\overline{MA} \perp \overline{MB}$,
 Then $m(\angle ACB) = \dots\dots^\circ$
 a) 90 b) 135 c) 110 d) 270
- (3) The center of circumcircle of a triangle is intersection point of
 a) Medians c) Axes of its sides
 b) Altitudes d) Bisectors of its angles



B): In the opposite figure:

$$m(\widehat{AB}) = m(\widehat{DB}) = m(\widehat{DC})$$

$$m(\angle C) = 40^\circ, \text{ find } m(\widehat{AC})$$



[Q3]

[A] Choose the correct answer:

(1) Number of symmetric axes of two touching circles externally is...

- a) 0 b) 1 c) 2 d) ∞

(2) If point A lies on surface of circle M and length of its diameter is 6 cm, then $m \in$

- a) $]-\infty, 6]$ b) $]-\infty, 3]$ c) $[0, 3]$ d) $]3, \infty[$

(3) ABCD is a quadrilateral inscribed in a circle, $m(\angle A) = 70^\circ$, then $m(\angle BAD) =$

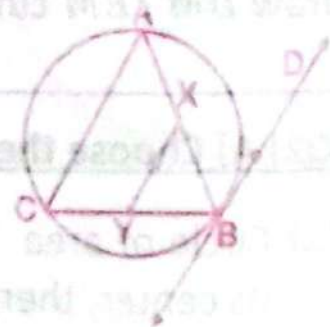
- a) 35 b) 55 c) 140 d) 220

[B] In the opposite figure:

ABC is triangle drawn in a circle,

$\overline{BD}$ is tangent, $\overline{BD} \parallel \overline{XY}$

Prove that: AXYC is cyclic quadrilateral.



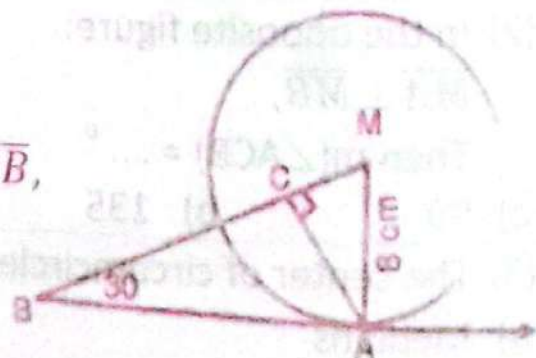
[Q4]

[A] In the opposite figure:

$\overline{BA}$ is tangent of circle M at A, $\overline{AC} \perp \overline{MB}$,

$$MA = 8 \text{ cm}, m(\angle B) = 30^\circ$$

Find the length of $\overline{AB}$, $\overline{AC}$

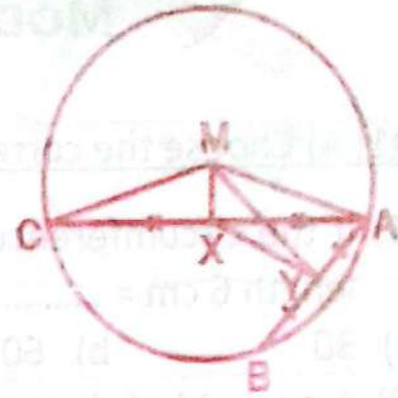


[B] In the opposite figure:

X is midpoint of $\overline{AC}$, Y is midpoint of $\overline{AB}$

① Prove that: $m(\angle MYX) = m(\angle MCX)$

② $\overline{AM}$ is diameter in circle passes A, X, M

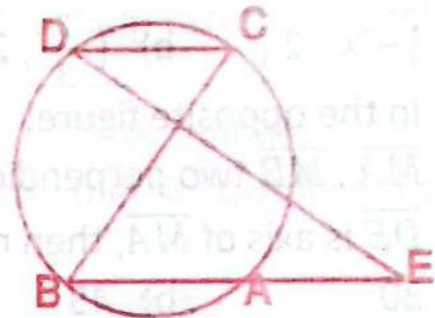


[Q5]

[A] In the opposite figure:

E is a point outside the circle

Prove that: $m(E) < m(BCD)$



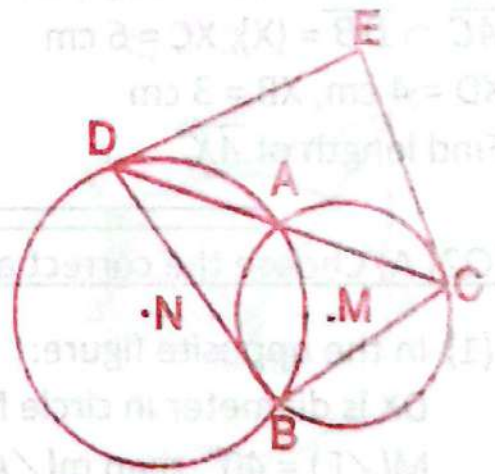
[B] In the opposite figure:

M, N are two circles intersecting at A, B

$\overline{EC}$ is tangent of circle M at C,

$\overline{DC}$ is tangent of circle N at D

Prove that ECBD is cyclic quadrilateral



End of the questions



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MODEL EXAM NO (6)

[Q1] A) Choose the correct answer:

(1) If the circumference of circle 36 cm, then measure of an arc of length 6 cm =°

- a) 30 b) 60 c) 90 d) 120

(2) A circle M of diameter 8 cm, A point inside it, if $MA = (3X-2)$ cm then $X \in$

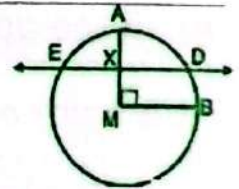
- a) $] -\infty, 2[$ b) $[\frac{2}{3}, 2[$ c) $[\frac{2}{3}, 6]$ d) $[2, \infty[$

(3) In the opposite figure:

$\overline{MA}$, $\overline{MB}$ two perpendicular radii

$\overline{DE}$ is axis of $\overline{MA}$, then $m(\angle BDE) = \dots^\circ$

- a) 30 b) 45 c) 90 d) 135

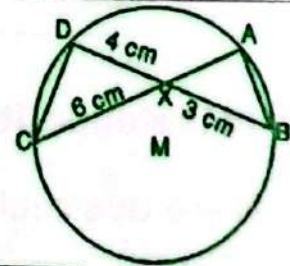


[B] In the opposite figure:

$\overline{AC} \cap \overline{DB} = \{X\}$, $XC = 6$ cm

$XD = 4$ cm, $XB = 3$ cm

Find length of $\overline{AX}$



[Q2] A) Choose the correct answer:

(1) In the opposite figure:

DX is diameter in circle M

$m(\angle E) = 40^\circ$, then $m(\angle A) = \dots^\circ$

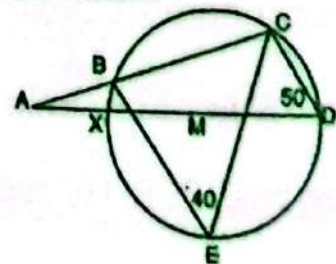
- a) 20 b) 30 c) 40 d) 50

(2) We can't draw a circle passing through A, B and $AB = 8$ cm if its radius cm

- a) 3 b) 4 c) 7 d) 8

(3) The axis of symmetry of common chord AB for intersecting circle at A, B is

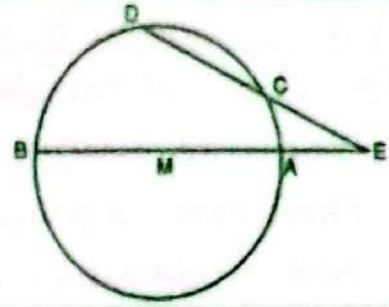
- a) $\overline{MA}$ b) $\overline{MB}$ c) $\overline{MN}$ d) $\overline{AN}$



[B] In the opposite figure:

$\overline{AB}$ is diameter in circle M, $\overline{BA} \cap \overline{DC} = \{E\}$

Prove that: $EC > EA$



[Q3]

[A] Choose the correct answer:

(1) Number of axes of symmetry of two touching externally circles is.....

- a) Zero b) 1 c) 2 d) Infinite

(2) A chord of 8 cm in a circle of radius 5 cm, then its distance from center Cm

- a) 1 b) 2 c) 3 d) 4

(3) ABCD is a cyclic quadrilateral, $m(\angle A) = 70^\circ$, then $m(\angle BAD) = \dots^\circ$

- a) 35 b) 55 c) 140 d) 220

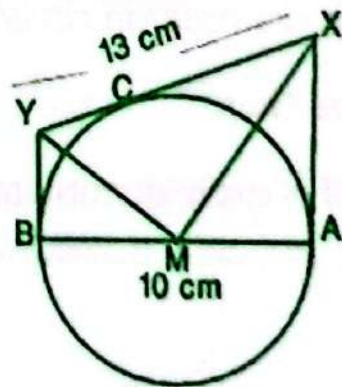
[B] In the opposite figure:

$\overline{AB}$ is diameter in circle M, $AB = 10$ cm

If $C \in$ circle M, draw a tangent at C
cut two tangents are drawn at A, B
in X, Y, $XY = 13$ cm.

① Prove that: $\overline{XM} \perp \overline{YM}$

② Find area of AXBY



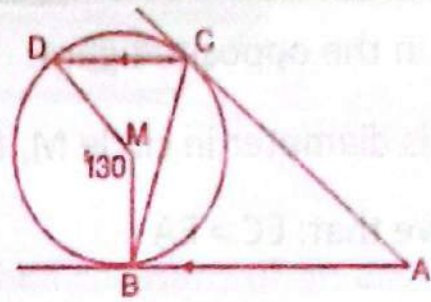
[4]

[A] ABCD is a quadrilateral drawn in a circle, $F \in \overline{AB}$, draw $\overline{FE} \parallel \overline{BC}$ and cut $\overline{CD}$ in E, $\overline{DF} \cap \overline{CB} = \{X\}$

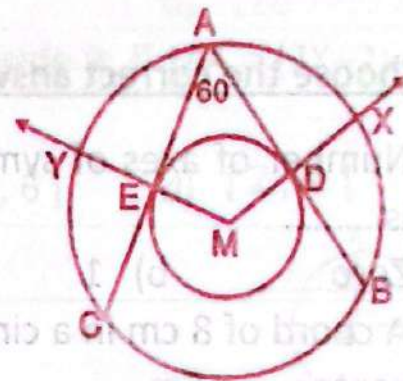
Prove that:

① AFED is cyclic quadrilateral

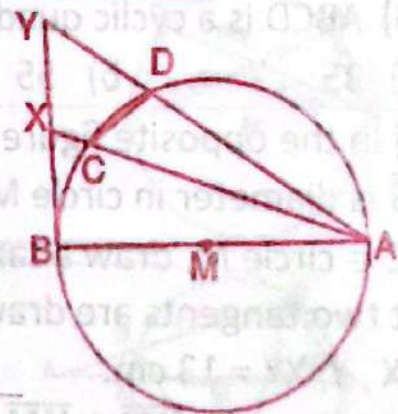
② $m(\angle BXF) = m(\angle EAD)$

B) In the opposite figure: $\overline{AB}$, $\overline{AC}$ are two tangents for circle M $\overline{AB} \parallel \overline{CD}$, $m(\angle BMD) = 130^\circ$ ① **Prove that:** CB bisects $\angle ACD$ ② **Find by prove** $m(\angle A)$ **[Q5]****[A] In the opposite figure:**Two concentric circles at M,
 $\overline{AB}$, $\overline{AC}$ are two chords in greater circle

And touch smaller circle at D, E

Draw $\overline{MD}$, $\overline{ME}$ cut greater circleat X, Y, $m(\angle DAE) = 60^\circ$ ① Find $m(\angle DME)$ ② Prove $XD = YE$ **B) In the opposite figure:** $\overline{AB}$ is diameter in circle M, $\overline{YB}$ is tangent**Prove that:**

DCXY is cyclic quadrilateral

◆◆◆
End of the questions

MODEL EXAM No (7)**[Q1] A) Choose the correct answer:**

(1) If $n_1(x) = \frac{1}{x-3}$, $n_2(x) = \frac{9}{x+8}$ then the domain of $(n_1 - n_2) = \dots$

- a) $\{3, -8\}$ b) $\mathbb{R} - \{3, -8\}$ c) $\mathbb{R} - \{3\}$ d) $\mathbb{R} - \{8\}$

(2) If the two equations $X + 2Y = 1$, $2X + aY = 5$ have one solution, then $a \in \mathbb{R} - \{\dots\}$

- a) 1 b) 2 c) 4 d) -4

(3) If $X + Y = 15$, then $(X - 10)^3 + (Y - 5)^3 = \dots$

- a) 0 b) 25 c) 125 d) 625

[B] Find the value of a, b where $(1, 2)$ is solution of two equations :

$$aX + bY + 5 = 0, \quad 2aX + bY - 2 = 0$$

[Q2] A) Choose the correct answer:

(1) A card is drawn randomly from some cards numbered from 1 to 50, the probability of this card contains a non-perfect square is

- a) $\frac{7}{50}$ b) $\frac{43}{50}$ c) $\frac{1}{2}$ d) $\frac{9}{50}$

(2) If $X^2 - Y^2 = 80$, $X - Y = 8$, The mean of the two numbers X and Y is

- a) 2 b) 3 c) 4 d) 5

(3) If $x + \frac{1}{x-2} = 4$, then $(x-2)^2 + \frac{1}{(x-2)^2} = \dots$ where $x \neq 0$

- a) -2 b) 2 c) 4 d) 0

[B] If the domain of $n(x) = \frac{k}{x-3} + \frac{4}{x+m}$ is $R - \{3, -4\}$, $n(2) = 7$,

Find the value of k, m ?

[Q3]

[A] Choose the correct answer:

(1) The set of zeros of the function $F(x) = -3x$ are

- a) {Zero} b) {3} c) {-3} d) $R - \{3\}$

(2) The simplest form of the function $n(x) = \frac{3-x}{x-3}$, where $x \in R - \{3\}$ is

- a) 1 b) -1 c) 3 d) -3

(3) If $n(x) = \frac{x-3}{x+2}$, then the domain of $n^{-1}(x) = \dots\dots\dots$

- a) $\{-2, 3\}$ b) $R - \{-2, 3\}$ c) $R - \{-2\}$ d) $R - \{3\}$
-

[B] The difference between the perimeter of two squares 12 cm. and the difference between the areas of two squares 33 cm^2 . Find the length of side of each square?

[4]

[A] Find $n(x)$ in the simplest form and showing its domain:

$$n(x) = \frac{x^2+3x+9}{x^3-27} - \frac{x^2-x-12}{9-x^2}$$

[B] By using a general formula:

Find in $\mathcal{R}$ the solution set of the equation $\frac{5}{x^2} - \frac{2}{x} = 1$,
approximating the result to nearest three decimal places. Where
 $\sqrt{6} = 2.45$

[Q5]

[A] Find $n(x)$ in the simplest form and showing its domain:

$$n(x) = \frac{x^2+x+1}{x^3-1} \div \frac{x^2-x}{x^2-2x+1}$$

[B] If A , B are two events of the sample space of a random experiment, and $P(A) = 0.2$, $P(A - B) = 0.3$, $P(B - A) = 0.4$

Find: ① $P(B)$

② $P(B \cup A)$

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End of the questions

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MODEL EXAM NO (8)**[Q1] A) Choose the correct answer:**

(1) If intersection point of two lines $X-1=0$, $Y-2k=0$ lies in fourth quadrant then k may be

- a) -5 b) 0 c) 1 d) 5

(2) The domain of the additive inverse of $n(x) = \frac{x}{x-3}$ is

- a) $\mathbb{R}$ b) $\mathbb{R} - \{0\}$ c) $\mathbb{R} - \{3\}$ d) $\mathbb{R} - \{0, 3\}$

(3) If: $X^2 = Y + Z$, $Y^2 = Z + X$, $Z^2 = X + Y$ then $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = \dots$

- a) -1 b) 1 c) 2 d) 4

B): By using a general formula, find in $\mathbb{R}$ the solution set of the equation $X + \frac{4}{x} = 6$, approximating the result to three decimal place.

[Q2] A) Choose the correct answer:

(1) If A is an event of the sample space of a random experiment, and $P(A) = 4P(A^c)$ then $P(A) = \dots$

- a) 0.8 b) 0.6 c) 0.4 d) 0.2

(2) The degree of the equation $XY = 3$ is

- a) First b) Second c) Third d) zero

(3) If $x(3 - \frac{2}{x}) = \frac{3}{x}$, then $(x)^2 + \frac{1}{(x)^2} = \dots$ where $x \neq 0$

- a) $2\frac{1}{9}$ b) $2\frac{4}{9}$ c) $3\frac{1}{9}$ d) $3\frac{4}{9}$

[B] If the area of rectangle 77 cm^2 , if its length decreased by 2 cm and its width increased by 2 cm , it will be a square. Find the area of square.

[Q3]

[A] Choose the correct answer:

(1) If $n(x) = \frac{x-2}{x+5}$, then the domain of $n^{-1}(x) = \dots\dots\dots$

- a) $\mathbb{R}$ b) $\mathbb{R} - \{2\}$ c) $\mathbb{R} - \{-5\}$ d) $\mathbb{R} - \{2, -5\}$

(2) If A, B are two mutually exclusive events from the sample space of a random experiment, then $P(A - B) = \dots\dots\dots$

- a) $P(B)$ b) $P(A)$ c) 0 d) 1

(3) If $F(x) = \frac{7+x}{7-x}$, where $x \in \mathbb{R} - \{\pm 7\}$, then $F(-2) = \dots\dots\dots$

- a) $\frac{-1}{f(-2)}$ b) $\frac{-1}{f(2)}$ c) $\frac{1}{f(2)}$ d) $\frac{1}{f(-2)}$

[B] n_1, n_2 two algebraic fractions, $n_1(x) = \frac{x^2-4}{x^2+x-6}$,

$n_2(x) = \frac{x^3-x^2-6x}{x^3-9x}$, prove that $n_1(x) = n_2(x)$ For all values of x in common domain and Find this domain?

[Q4]

[A] Find $n(x)$ in the simplest form showing its domain:

$$n(x) = \frac{x^2-2x}{4-3x^3+2x^2} \times \frac{4-x^2}{x^2+x-2}$$

Find the S.S when $n(x) = 0$

[B] If A , B are two events of the sample space of a random experiment, and $P(B) = \frac{1}{3}$, $P(A-B) = \frac{1}{4}$, find P (A) if:

① $P(A \cap B) = \frac{1}{12}$

② $B \subset A$

[Q5]

[A] Find n (x) in the simplest form showing its domain:

$$n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{x^2 - 25}{x^2 - 3x}$$

Find the value of A if $n(A) = \frac{1}{3}$

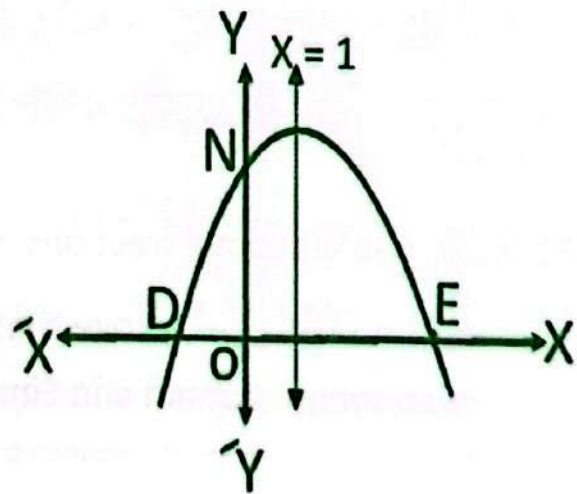
[B] In the opposite figure:

The quadratic curve of $\mathcal{F}$:

$$\mathcal{F}(x) = aX^2 + bX + c$$

The axis of symmetry is $X = 1$

N (0,12) , E (3,0) Find $\mathcal{F}(x)$



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End of the questions

MODEL EXAM No (9)**[Q1] A) Choose the correct answer:**

(1) The two equations $X + 4Y = m$, $3X + KY = 21$ have infinite solution in $R \times R$ when $K + m = \dots\dots\dots$

- a) 19 b) 20 c) 21 d) 22

(2) If : $X^2 - 4x - 1 = 0$, then $3x - \frac{3}{x} = \dots\dots\dots$

- a) 2 b) 3 c) 4 d) 12

(3) If a coin tossing once, the probability of appearing head or tail equal.....

- a) 100 % b) 50 % c) 25 % d) 0

[B] By using a general formula, find in R the solution set of the equation $\frac{x^2}{9} + \frac{4}{3}x = -2$, approximating the result to nearest three decimal places.

[Q2] A) Choose the correct answer:

(1) The common domain of $\frac{2}{x^2-1}$, $\frac{5x}{x^2-x}$ is

- a) $R - \{1\}$ b) $R - \{0, 1\}$ c) $R - \{-1, 1\}$ d) $R - \{0, 1, -1\}$

(2) If $2^{x+y} = 32$, $3^x = 9$ then $(x)^y = \dots\dots\dots$

- a) $\frac{1}{8}$ b) 8 c) $\frac{1}{9}$ d) 9

(3) If the domain of $n(x) = \frac{x+b}{x+a}$ is $R - \{-2\}$, $n(0) = 3$, then the value of $a + b = \dots\dots\dots$

- a) 2 b) 6 c) 8 d) 10

[B] Find in $R \times R$ solution set of two equations:

$$X + Y = 2, \frac{1}{x} + \frac{1}{y} = 2 \text{ where } X \neq 0, Y \neq 0$$

[Q3]**[A] Choose the correct answer:**

(1) If the curve of the quadratic function F passing through the points $(2, 0)$, $(-3, 0)$, $(0, -6)$, then the solution set of the function $F(X) = 0$ in R is

- a) $\{-2, 3\}$ b) $\{3, 2\}$ c) $\{2, -3\}$ d) $\{-3, -6\}$

(2) The simplest form of the function $n(x) = \frac{3-x}{x-3}$, where $X \in R - \{3\}$ is

- a) 1 b) -1 c) 3 d) -3

(3) If A is an event from the sample space, then $P(A^c) = \dots\dots\dots$

- a) 1 b) -1 c) $1 - P(A)$ d) $P(A) - 1$

[B] If A , B are two events of the sample space of a random experiment, and $P(A) = 0.6$, $P(B) = 0.7$, $P(A \cap B) = 0.4$, Find:

- ① The probability of non-occurrence of A , B together.
- ② The probability of occurrence at least one of them.

[Q4]

[A] Find $n(x)$ in the simplest form and showing its domain:

$$n(x) = \frac{x-6}{2x^2-15x+18} + \frac{x-5}{15-13x+2x^2}$$

[B] n_1, n_2 two algebraic fractions, $n_1(x) = \frac{x^3+1}{x^3-x^2+x}$, $n_2(x) = \frac{x^3+x^2+x+1}{x^3+x}$

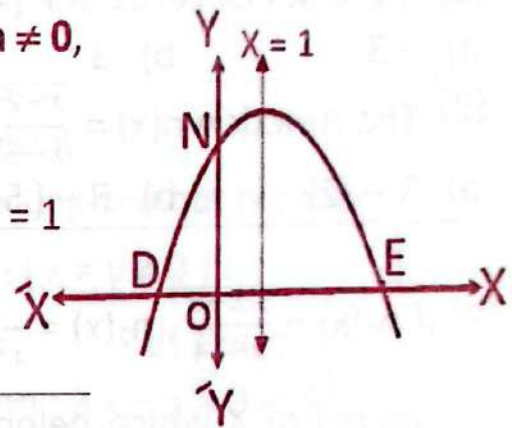
⤴ Show that if $n_1 = n_2$ or not with giving the reason

[Q5]

[A] Find $n(x)$ in the simplest form showing its domain:

$$n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$$

[B] The opposite figure represents the curve

Of function $\mathcal{F}$: $\mathcal{F}(x) = ax^2 + bx + c$, $a \neq 0$,If $OK = 30$ unit length, $5 OD = 3 OE$ And equation of line of symmetry is $X = 1$ Find the value of a, b, c ◆◆◆
End of the questions

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MODEL EXAM NO (10)**[Q1] [A] Choose the correct answer:**

(1) The two equations $3X + 1 - 5Y = 8$, $2X + KY = m$ have infinite solution in $R \times R$ when $9Km = \dots\dots\dots$

- a) $\frac{-10}{3}$ b) $\frac{16}{3}$ c) -16 d) -160

(2) If the set of zeros of $F(x) = KX + 3$ is $\emptyset$, then $K = \dots\dots\dots$

- a) -3 b) 3 c) 0 d) 1

(3) The function $n(x) = \frac{x-2}{x-5}$, has an additive inverse in the domain....

- a) $R - \{2\}$ b) $R - \{5, -2\}$ c) $R - \{5\}$ d) $R - \{5, 2\}$

[B] If $n_1(x) = \frac{3x-6}{x^2-4}$, $n_2(x) = \frac{3x+3}{x^2+3x+2}$ prove that $n_1(x) = n_2(x)$ for all the values of X which belongs to the common domain and find this domain?

[Q2] [A] Choose the correct answer:

(1) If S is a sample space of a random experiment, then $P(S^c) = \dots\dots\dots$

- a) 1 b) 0 c) -1 d) $\frac{1}{2}$

(2) If $\frac{x-a}{x+3}$ is an algebraic fraction has a multiplicative inverse is $\frac{x+3}{x+5}$ then $a = \dots\dots\dots$

- a) -5 b) -3 c) 5 d) 3

(3) If $X^2 + Y^2 = 5XY$ then $\frac{x^2}{y^2} + \frac{y^2}{x^2} = \dots\dots\dots$

- a) 32 b) 23 c) -32 d) -23

[B] By using a general formula and find in $\mathbb{R}$ the solution set of the equation: $1 - \frac{2}{x} = \frac{5}{x^2}$, approximating the result to nearest two decimal places.

[Q3]

[A] Choose the correct answer:

(1) The two straight lines: $X = 3$, $Y = 5$ are

- a) Parallel c) Coincident
b) perpendicular d) Intersecting and not perpendicular

(2) The equation: $\frac{1}{x} + \frac{1}{y} = 3$ in Degree ($x \neq y \neq 0$)

- a) First b) Second c) Third d) Fourth

(3) The number of solution of the equation : $2x - 6 = 0$ in $\mathbb{R}^2$ is

- a) 1 b) 2 c) 3 d) infinite

[B] A rectangle of perimeter 14 cm. and its diagonal length 5 cm.

Find its two dimensions?

[4]

[A] If the set of zeros of $F(X) = \frac{x^2 - ax + 9}{bx + 4}$ is $\{3\}$, and its domain $R - \{2\}$.

Find the value of a , b ?

[B] If A, B are two events of the sample space of a random experiment, and $P(A - B) = \frac{5}{12}$, $P(B) = \frac{1}{3}$, $P(A) = P(A^c)$,

Find: ① probability of occurrence one of them at least.

② Probability of occurrence event B only.

[5]

[A] Find in the simplest form: $n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{x^2 - 25}{x^2 - 3x}$

and showing its domain. If $n(k) = \frac{1}{3}$,

Find the value of K.

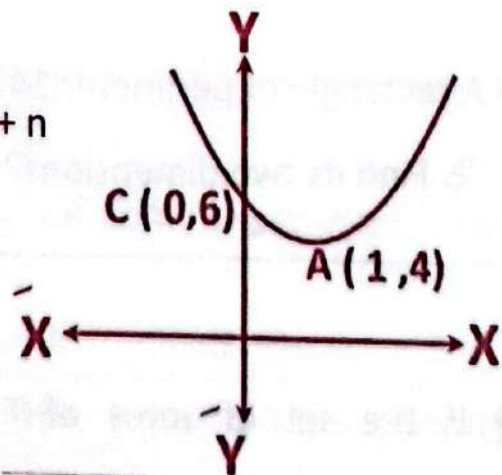
[B] In the opposite figure:

The curve of $\mathcal{F}$: $\mathcal{F}(x) = kx^2 + mx + n$

Cut y-axis in $C(0, 6)$, $A(1, 4)$

is the vertex of the curve

Find the value of K, m, n.



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End of the questions

MODEL EXAM No (11)

[Q1] [A] Choose the correct answer:

(1) If A is an event in a sample space of a random experiment, then $P(A \cup A^c) = \dots\dots\dots$

- a) 1 b) 0 c) -1 d) half

(2) The set of zeros of $f(x) = \frac{x^2 \cdot x - 2}{x^2 - 4}$ is

- a) $\{-1, 2\}$ b) $\{-2, 2\}$ c) $\{-1\}$ d) $\{-2\}$

(3) The intersecting point of the two straight lines:

$$3x + y = 0, 2x = 7y, \text{ lies in } \dots\dots\dots$$

- a) First quadrant c) Third quadrant
b) Second quadrant d) On origin point

[B] By using a general formula, find in $\mathcal{R}$ the solution set of the equation $x + \frac{4}{x} = 6$, approximating the result to nearest three decimal places.

[Q2] [A] Choose the correct answer:

(1) If the equation $ax^2 + 6x + 3 = 0$, hasn't real solution then a ...

- a) $] -\infty, 3[$ b) $] 3, \infty[$ c) $\{3\}$ d) $\{3, -3\}$

(2) If $x^2 - 3x + 1 = 0$, then $x + \frac{1}{x} = \dots\dots\dots$ (where $x \neq 0$)

- a) 1 b) 3 c) -1 d) -3

(3) If $n(x) = \frac{x^2 - x}{x^2 - 1}$, $n^{-1}(k) = 3$, then $K = \dots\dots\dots$

- a) $-\frac{3}{2}$ b) $\frac{1}{2}$ c) $\frac{3}{4}$ d) $\frac{4}{3}$

- [B] A rhombus the difference between their diagonal 4 cm. and its perimeter 40 cm. Find the length of its diagonals?

[Q3]

[A] Choose the correct answer:

- (1) A two digit number, its unit digit = its tens digit = X , then the number is

a) X^2 b) $2X$ c) $11X$ d) $10X^2$

- (2) If n is a function: $n(x) = \frac{x+1}{x-1} + \frac{1-x}{x-1}$, ($x \neq 1$), then n in the simplest form is

a) 0 b) $\frac{2}{2x-2}$ c) $\frac{2}{x-1}$ d) $\frac{2}{(x-1)^2}$

- (3) If A, B are two mutually exclusive events from a sample space, then $A \cap B = \dots\dots\dots$

a) $\emptyset$ b) S c) Zero d) 1

- [B] If n_1, n_2 two algebraic fractions, Prove that $n_1 = n_2$?

Where $n_1(x) = \frac{x^2 - x}{x^3 - 2x^2}$, $n_2(x) = \frac{x^2 - 3x + 2}{x^3 - 4x^2 + 4x}$

[Q4]

[A] Find $n(x)$ in the simplest form showing its domain:

$$n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$$

[B] If the domain of $n(x) = \frac{k}{x-3} + \frac{4}{x+m}$ is $\mathbb{R} - \{3, -4\}$, $n(2) = 7$

Find the value of k, m ?

[Q5]

[A] If A, B are two events of the sample space of a random experiment, and $P(A) = \frac{1}{2}$, $P(B) = \frac{2}{5}$, $P(A \cap B) = \frac{1}{10}$ Find:

① $P(A \cup B)$

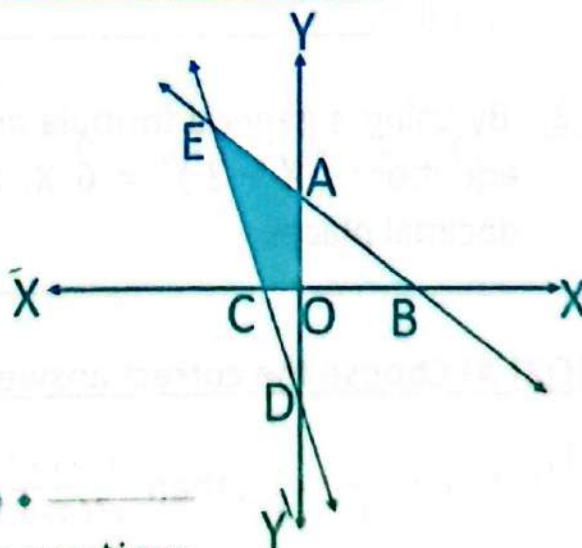
② $P(B - A)$

[B] In the opposite figure:

If the equation of $\overleftrightarrow{AB}$: $X + Y = 3$,

Equation of $\overleftrightarrow{CD}$: $2X + Y + 4 = 0$

Find the area of the shaded part



End of the questions

MODEL EXAM NO (12)

[Q1] A) Choose the correct answer:

(1) If A, B are two events of the sample space of a random $P(A \cap B)$,
 $(A - B) \cup (B \cap A) = \dots\dots\dots$

- a) 1 b) S c) B d) A

(2) If the domain of $F(X) = \frac{-2x}{x-5} - \frac{1}{k-x}$ is $R - \{5, -2\}$, then $k = \dots$

- a) 2 b) 5 c) -2 d) -5

(3) If $AB = 12, BC = 20, AC = 15$ where $A, B, C \in R^+$ then $ABC = \dots$

- a) 360 b) 3600 c) 60 d) 36

[B] By using a general formula and, find in R the solution set of the equation: $(X - 2)^2 = 6X$, approximating the result into two decimal places

[Q2] A) Choose the correct answer:

(1) If $x + \frac{2}{x} = 1$, then $\frac{x^2+x+2}{x^2(1-x)} = \dots\dots\dots$ where $x \neq 0$

- a) 1 b) 2 c) -1 d) -2

(2) The two equations $X + 4Y = 7, 3X + KY = 21$ have infinite solution in $R \times R$ when $K = \dots\dots\dots$

- a) 4 b) 7 c) 12 d) 21

(3) If $F(X) = x^2 + ax + 1, Z(f) = \emptyset$, then a can be = $\dots\dots\dots$

- a) 3 b) 2 c) 1 d) -2

B): Find $F(x)$ in its simplest form and showing its domain,

$$F(x) = \frac{x^2 + 2x}{x^3 - 27} \div \frac{x+2}{x^2 + 3x + 9}$$

[Q3]

[A] Choose the correct answer:

(1) The two straight lines $X = 3$, $3Y = 5$ are

- a) perpendicular c) Parallel
b) Coincide d) Intersecting and not perpendicular

(2) If $n(x) = \frac{x-1}{x-2}$, then the domain of $n^{-1}(x) = \dots\dots\dots$

- a) $\mathbb{R}$ b) $\mathbb{R} - \{1\}$ c) $\mathbb{R} - \{1, 2\}$ d) $\mathbb{R} - \{2\}$

(3) If A , B are two events from the sample space of a random experiment, $A \subset B$, then $P(A \cup B) = \dots\dots\dots$

- a) Zero b) $P(B)$ c) $P(A)$ d) $P(A \cap B)$

[B] If $n_1(x) = \frac{x^3 + 1}{x^3 - 2x^2 + x}$, $n_2(x) = \frac{x^3 + x^2 + x + 1}{x^3 + x}$

Show that if $n_1(x) = n_2(x)$ Give the reason?

[Q4] A) If $n(X) = \frac{x^2 - 2x}{x^2 + x - 6}$. Find:

① $n^{-1}(x)$ showing its domain

② If $n^{-1}(x) = 2$, find the value of X .

[B] If the length of a rectangle exceeds its width with 3 cm, its area 28 cm^2 . find its perimeter.

[Q5]

A) Find in $\mathcal{R} \times \mathcal{R}$ the solution set of two equations:

$$2|X| - |Y| = 2, 3|X| + |Y| = 3$$

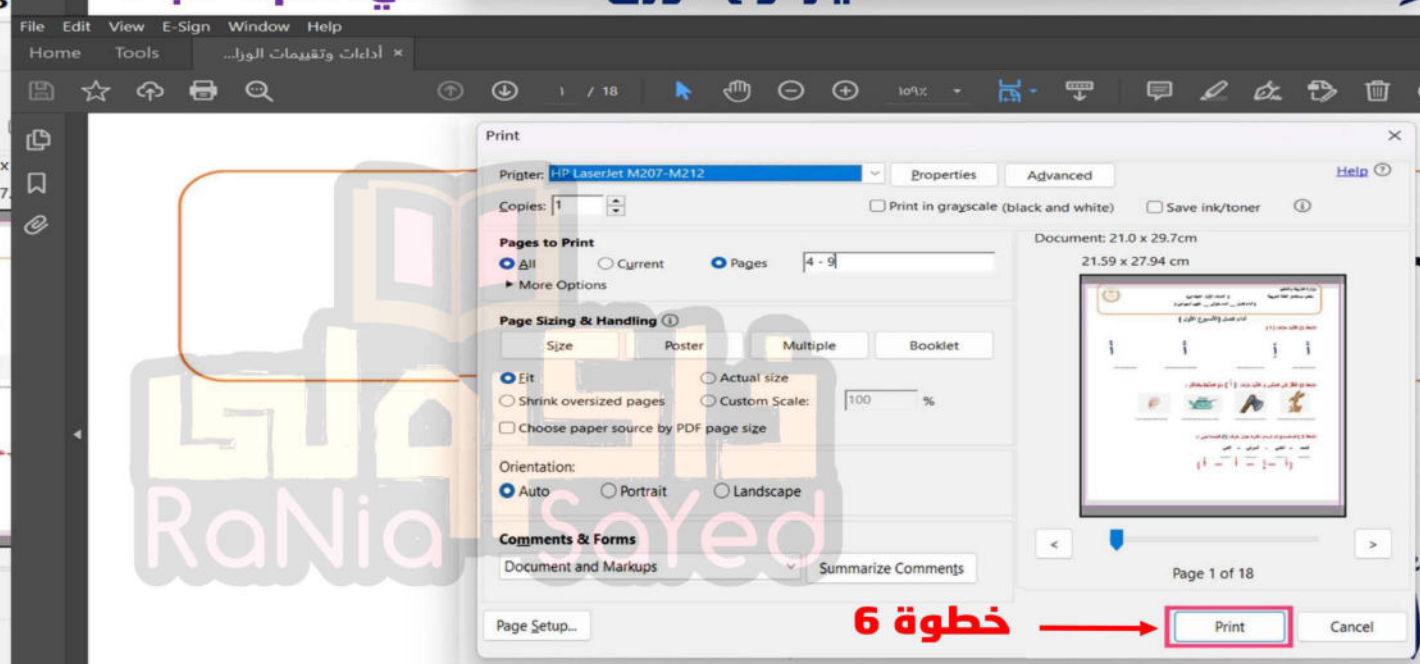
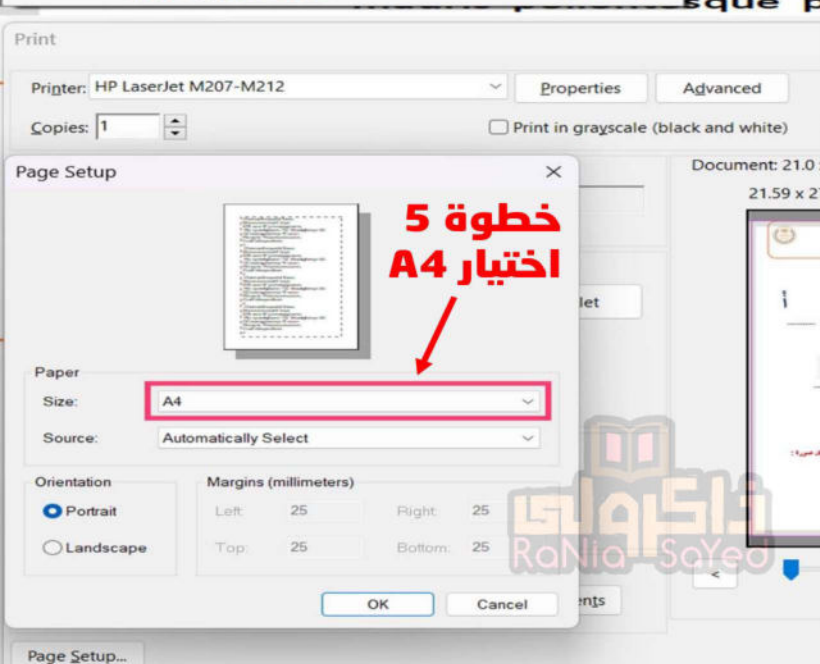
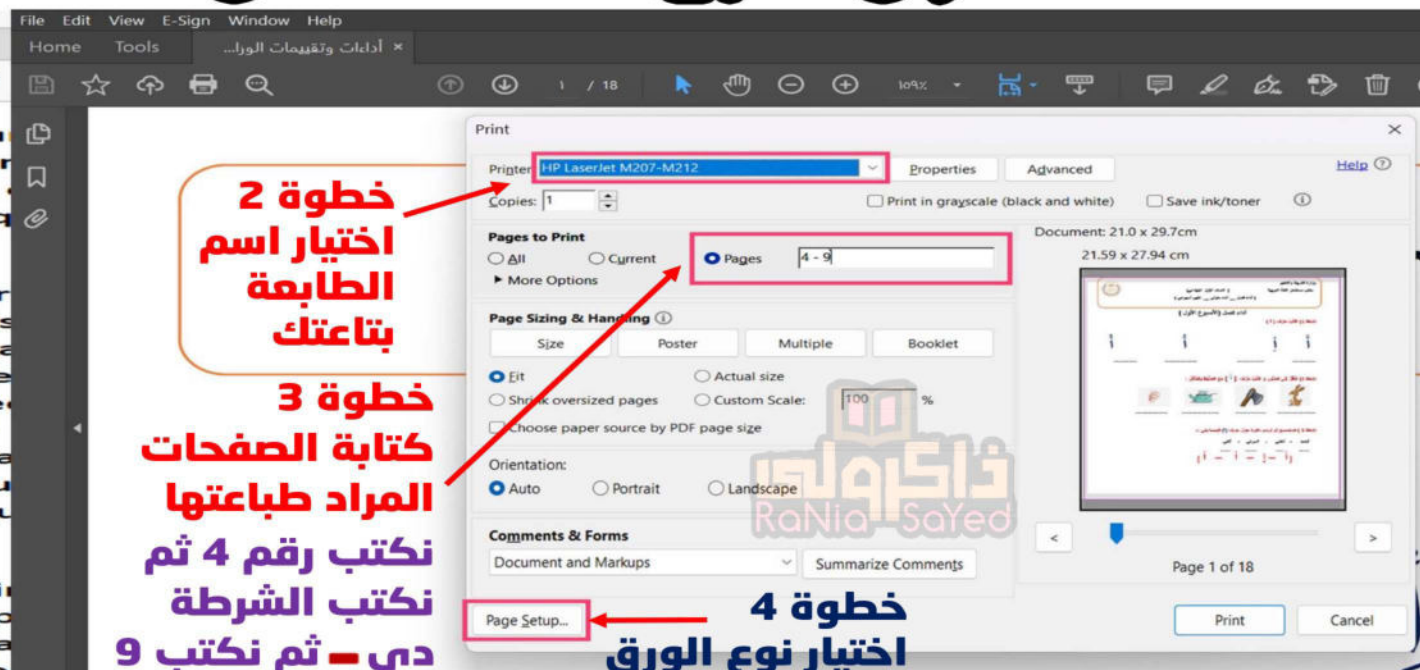
[B] If A , B are two events of the sample space of a random experiment, and $P(A) = P(A^c)$, $P(B) = \frac{5}{8} P(A)$, $P(A \cap B) = \frac{1}{16}$,

Find: ① $P(B)$, $P(A \cup B)$
② $P(A - B)$

◆◆◆
End of the questions

م/أحمد حسود
1004158925

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجانا وحصريا

امتحانات رقم (2)

الترم الثاني



Group (1): Choose the correct answer from those given:

- 1 $R^+ \cap R^- = \dots\dots\dots$
(a) R (b) $R - \{ \text{zero} \}$ (c) $\emptyset$ (d) $\{ \text{zero} \}$
.....
.....
- 2 If A, B are two mutually exclusive events from a sample space of a random experiment, $P(A) = 0.2$, then $P(A - B) = \dots\dots\dots$
(a) zero (b) 0.2 (c) 0.8 (d) 1
.....
.....
- 3 Two positive numbers, one of them is twice the other and their product is 32, then the two numbers are
(a) 2, 4 (b) 3, 6 (c) 4, 8 (d) 6, 12
.....
.....
- 4 The domain $\frac{x+5}{2x(x-1)}$ is
(a) $R - \{ 2 \}$ (b) $R - \{ 0, 1 \}$ (c) $R - \{ 0, 2 \}$ (d) $\{ 2, 1 \}$
.....
.....
- 5 The number of solutions of the equation of first degree in two variables in $R \times R$ is
(a) zero (b) 1 (c) 2 (d) an infinite number
.....
.....

بقية الأسئلة في الصفحات التالية

6 The simplest form of the expression $\frac{2x}{x-2} + \frac{4}{2-x}$ equals where $x \neq 2$

- (a) 2 (b) 1 (c) -1 (d) -2

7 The algebraic fraction $\frac{1}{x-1} = \dots\dots\dots$ where $x \neq 1$

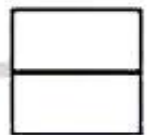
- (a) $\frac{x}{x^2-1}$ (b) $\frac{1}{x}$ (c) $\frac{-1}{1-x}$ (d) $\frac{x-1}{x}$

8 $\frac{4x}{x+3} \times \frac{x+3}{x}$ is

- (a) 1 (b) 2 (c) 3 (d) 4

9 If $n(x) = \frac{2x}{x+4}$, then the domain of $n^{-1}(x)$ is

- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{2,4\}$ (c) $\mathbb{R} - \{0,4\}$ (d) $\mathbb{R} - \{0, -4\}$



بقية الأسئلة في الصفحات التالية

Group (2): Answer the following questions showing the steps of solution:

(10) Find $n(x)$ in the simplest form showing its domain where:

$$n(x) = \frac{x^3 - 8}{x^2 - 4} \div \frac{x^2 + 2x + 4}{x + 2}$$

(11) Find in $R \times R$ the solution set of the two equations:

$$x - y = 4 \quad , \quad 5x + y = 14$$

بقية الأسئلة في الصفحات التالية

(12) Find $n(x)$ in the simplest form showing its domain where:

$$n(x) = \frac{x^2 - 4x}{x^2 - 16} + \frac{x - 5}{x^2 - x - 20}$$

(13) Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations:

$$x = 2y, \quad x^2 - y^2 = 75$$

بقية الأسئلة في الصفحات التالية

(14) If the domain of the function $n: n(x) = \frac{x-1}{x^2 - ax + 9}$ is $\mathbb{R} - \{3\}$, find the value of a

(15) By using the general formula find in $\mathbb{R}$ the solution set of the equation:

$$x^2 - 3x - 1 = 0 \quad (\text{to the nearest one decimal place})$$

بقية الأسئلة في الصفحة التالية

(16) If A, B are two events from a sample space of a random experiment and

$$P(A) = 0.6, \quad P(B) = 0.3, \quad P(A \cap B) = 0.2$$

Find: (a) $P(A \cup B)$

(b) $P(A - B)$

Group (1) : Choose the correct answer from those given:

- 1 The angle of measure 50° complements an angle of measure
(a) 20 (b) 40 (c) 90 (d) 130
- 2 The measure of the inscribed angle equals the measure of the opposite arc.
(a) quarter (b) third (c) half (d) double
- 3 The number of the axes of symmetry of the rectangle equals
(a) zero (b) 1 (c) 2 (d) 4
- 4 If $AB = 8$ cm , then the radius length of the smallest circle passes through the two points A and B equals cm
(a) 2 (b) 5 (c) 4 (d) 8
- 5 If M and N are two circles touching externally and the lengths of their radii are 5 cm , 8 cm , then $MN =$ cm
(a) 3 (b) 5 (c) 8 (d) 13

بقية الأسئلة في الصفحات التالية

6 If the figure ABCD is a cyclic quadrilateral and $m(\angle A) = 75^\circ$, then the measure of the exterior angle at the vertex C equals°

- (a) 15 (b) 75 (c) 105 (d) 180

7 The line segment joining the centre of the circle and a point on it is called

- (a) a chord (b) a radius (c) a diameter (d) a tangent

8 The length of the arc opposite to a central angle of measure 90° in a circle whose circumference is 36 cm equals cm

- (a) 18 (b) 12 (c) 9 (d) 3

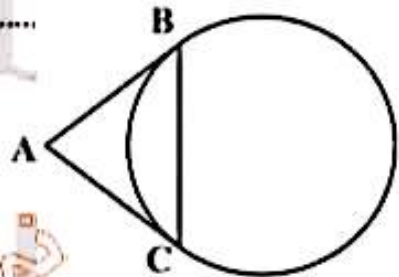
9 In the opposite figure:

$\overline{AB}$, $\overline{AC}$ are two tangents to the circle at B and C,

If $AB = 5$ cm and $BC = 6$ cm,

then the perimeter of ABC = cm

- (a) 10 (b) 11 (c) 16 (d) 1



بقية الأسئلة في الصفحات التالية

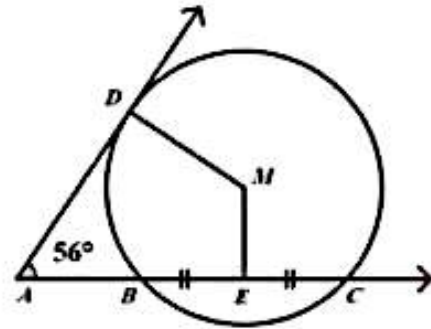
(12) In the opposite figure:

$\overline{AC}$ is tangent to the circle M at D ,

$\overline{AC} \cap \text{the circle M} = \{B, D\}$,

E is midpoint of $\overline{BC}$, $m(\angle A) = 56^\circ$,

find with proof $m(\angle DME)$

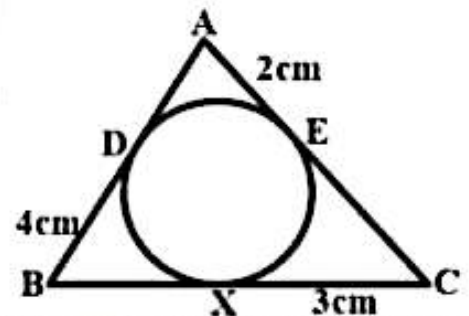


(13) In the opposite figure:

ABC is a triangle outside a circle touches its sides

$\overline{AB}$, $\overline{BC}$ and $\overline{AC}$ at D , X and E respectively

Find the perimeter of triangle ABC



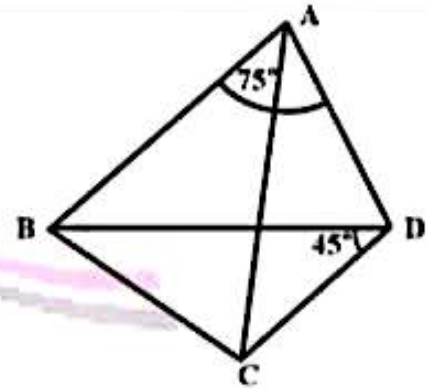
بقية الأسئلة في الصفحات التالية

(14) In the opposite figure:

ABCD is a cyclic quadrilateral

$$m(\angle BDC) = 45^\circ, m(\angle BAD) = 75^\circ$$

find with proof $m(\angle CAD)$

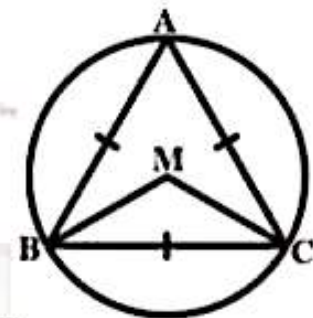


(15) In the opposite figure:

ABC is an equilateral triangle inscribed in circle M

Find: First: $m(\angle BMC)$

Second: $m(\angle MBC)$



بقية الأسئلة في الصفحة التالية

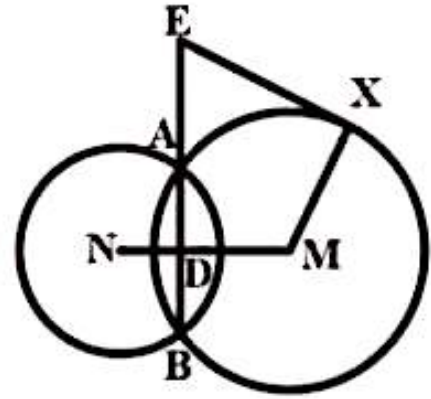
(16) In the opposite figure:

Two circles M , N intersect at A , B

$\overline{XE}$ is a tangent to the circle M, $\overline{MN} \cap \overline{AB} = \{D\}$

First: Prove that EDMX is a cyclic quadrilateral

Second: Find the length of $\overline{AB}$ if $AD = 3\text{cm}$



(انتهت الأسئلة مع خالص الدعاء بالتوفيق)

مديرية التربية والتعليم
Directorate Of Education In Cairo

a) 5 b) 4 c) 3 d) 2

a) 130 b) 65 c) 50 d) 25

a) 1 : 3 b) 4 : 6 c) 1 : 2 d) 2 : 1

A circle with a horizontal diameter BC . Point A is on the upper arc, and point D is on the minor arc AC . Line segments AB , AC , AD , and DC are drawn. Angle ADC is labeled as 120° .

Find with proof $m(\angle ACB)$

Solution

((Second Page))

Third Question: (A) Choose the correct answer:

9) The number of circles passing through three noncollinear points is

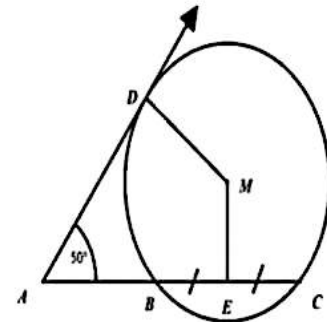
- a) Zero b) 1 b) 2 d) 3

10) In the opposite figure:

$\overrightarrow{AD}$ is tangent to the circle M at D, $\overrightarrow{AC}$ cut the circle M

at B and C, $m(\angle A) = 50^\circ$, E is the midpoint of $\overline{BC}$

then $m(\angle DME) = \dots\dots\dots^\circ$



- a) 50 b) 40 c) 130 d) 110

11) The axis of symmetry of the common chord $\overline{AB}$ of the two intersected circles M and N is

- a) $\overline{MN}$ b) $\overline{MA}$ c) $\overline{MA}$ d) $\overline{MB}$

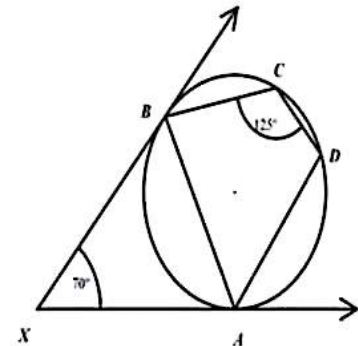
(B) Answer the following question:

12) In the opposite figure :

$\overrightarrow{XA}$, $\overrightarrow{XB}$ are two tangents to the circle at A and B respectively,

$m(\angle AXB) = 70^\circ$, $m(\angle C) = 125^\circ$

Prove that : $\overrightarrow{AB}$ is the bisector of $\angle DAX$



Solution

Fourth Question:

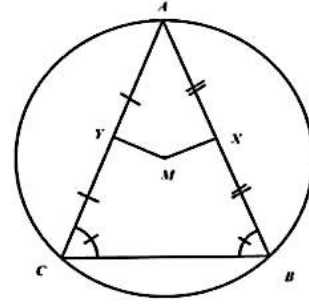
13) In the opposite figure:

ABC is a triangle inscribed in the circle M

$m(\angle B) = m(\angle C)$, X et Y are midpoints of $\overline{AB}$ and $\overline{AC}$

Prove that : $MX = MY$

Solution



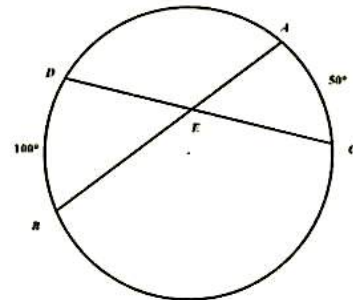
14) In the opposite figure:

$\overline{AB} \cap \overline{CD} = \{E\}, m(\widehat{AC}) = 50^\circ,$

$m(\widehat{BD}) = 100^\circ$

Find with proof $m(\angle AEC)$

Solution



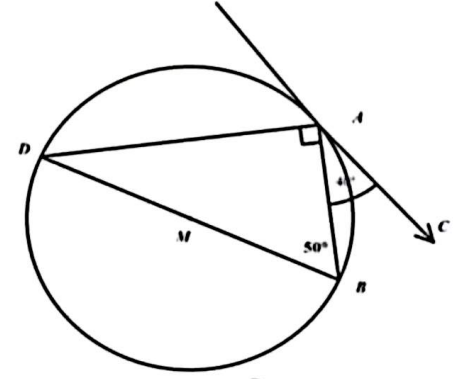
((fourth Page))

Fifth Question:

15) In the opposite figure:

$\overline{BD}$ is a diameter of the circle M
 $m(\angle BAC) = 40^\circ$, $m(\angle ABD) = 50^\circ$

Prove that : $\overrightarrow{AC}$ is tangent to cercle M at point A

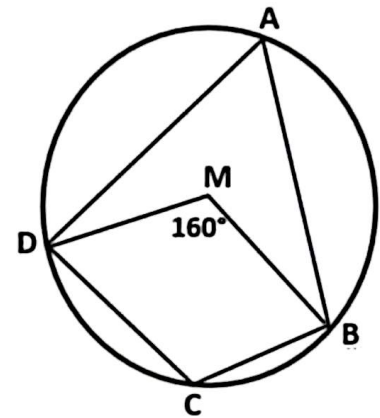


Solution

16)In the opposite figure:

ABCD is a cyclic quadrilateral,
 $m(\angle BMD) = 160^\circ$,Find with proof $m(\angle C)$

Soultion



Choisis la bonne réponse:

1) Si A est un évènement de l'espace des éventualités d'une expérience aléatoire et Si $P(A') = 0,6$ alors $P(A) = \dots\dots\dots$

a) 0,6

b) 0,4

c) 0,5

d) 1

2) L'ensemble solutions des deux équations $y^3 - 27 = 0$ et $\sqrt{x} - 2 = 0$ dans $R \times R$ est.....

a) $\{4; 3\}$ b) $\{-4; 3\}$ c) $\{(4; 3)\}$ d) $\{(3; 4)\}$

3) L'ensemble définition de la fonction $f(x) = \frac{x^2-9}{x^2-3x}$ est

a) $\{3; -3\}$ b) $R - \{3; -3\}$ c) $R - \{0; 3\}$ d) $R - \{-3; 3, 0\}$

4) **Réponds à la question**

Détermine l'ensemble solution dans $R \times R$ des deux équations :

$$x + y = 3, \quad 2x - y = 3$$

Solution:

Choose the correct answer:



1) If A is an event in the sample space of a random experiment et and if $P(A') = 0.6$ then $P(A) = \dots\dots\dots$

a) 0.6

b) 0.4

c) 0.5

d) 1

2) The solution set of the two equations $y^3 - 27 = 0$ et $\sqrt{x} - 2 = 0$ in $R \times R$ is.....

a) $\{4; 3\}$ b) $\{-4; 3\}$ c) $\{(4; 3)\}$ d) $\{(3; 4)\}$

3) The domain of the function $f(x) = \frac{x^2 - 9}{x^2 - 3x}$ is

a) $\{3; -3\}$ b) $R - \{3; -3\}$ c) $R - \{0; 3\}$ d) $R - \{-3; 3, 0\}$

4) **Answer the question**

find the solution set in $R \times R$ of the two equations :

$$x + y = 3 \quad , \quad 2x - y = 3$$

Solution:

Choose the correct answer:

5) If : $x^2 - y^2 = 15$ and $x - y = 3$ then $x + y =$

a) 30

b) 18

c) 9

d) 5

6) The set of zeros of the function $f(x) = \frac{x^3 - x}{x - 1}$ is

a) {1}

b) {-1}

c) {-1; 0}

d) {1 ; 0; -1}

7) The solution set of the two equations $y - 2 = 0$ and $x^2 + y^2 = 8$ in $R \times R$ is.....

a) {(-2; 2); (2; 2)}

b) {(2; 2); (-2; -2)}

c) {(-2; 2)}

d) {(2; 2)}

8) **Answer The question**

Using the general formula find the solution set of the following equation in R

$x^2 - 2x - 7 = 0$ (taking $\sqrt{2} \cong 1,41$; round the result to the nearest two decimal places

Solution

Choose the correct answer:

9) If A and B are two events in the sample space U , and $A \subset B$,
 $P(A) = 0.4$, $P(A \cup B) = 0.7$; then $P(B - A) = \dots\dots\dots$

a) 0.4

b) 0.7

c) 1

d) 0.3

10) $[2; 5] -]2; 5[\dots\dots\dots$

a) $\{2; 5\}$

b) $\{2\}$

c) $\{5\}$

d) $]2; 5]$

11) The multiplicative inverse of the function $f(x) = \frac{x^2 - 4}{2x^2 - 2x}$ is $\dots\dots\dots$

a) $x(x - 2)$

b) $\frac{x+2}{x}$

c) $\frac{x+2}{x-2}$

d) $\frac{x}{x+2}$

12) Answer the question

Find $n(x)$ in the simplest form and find its domain,

$$\text{If : } n(x) = \frac{x^2 + 4x}{x^2 - 16} + \frac{4x - 12}{x^2 + x - 12}$$

Solution

Answer the following Questions:

13) If $n_1(x) = \frac{x}{x-1}$ and $n_2(x) = \frac{x^2-x}{x^2-2x+1}$; prove that $n_1 = n_2$

Solution

14) Find $n(x)$ in the simplest form and find its domain,

$$n(x) = \frac{x-2}{x^2-x-2} : \frac{6}{2x+4}$$

Solution

15) If $n(x) = \frac{2x-4}{x^2-3x+2}$ Find $n^{-1}(x)$: and find its domain ; then find $n^{-1}(3)$ if possible

16) If A and B are two events in the sample space U , and $P(A) = 0.6$; $P(B) = 0.7$; $P(A \cap B) = 0.5$

Find

a) $P(A \cup B)$

b) The probability that only event A occurs

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امتحانات رقم (3)

الترم الثاني



A Choose the correct answer:

- 1 The number of solutions of the first degree equation in two variables is
solution(s). (0 , 1 , 2 , infinite)
- 2 If $\sqrt{36} = m\sqrt{4}$, then $m =$ (3 , 4 , 12 , 9)
- 3 If A , B are two mutually exclusive events from the sample space of a random experiment ,
 $P(A \cap B) =$ (0 , 1 , $\frac{1}{2}$, $\frac{1}{4}$)
- 4 The point of intersection of the two straight lines : $x - 2 = 0$ and $y = -1$ is
[(2 , -1) , (-2 , -1) , (2 , 1) , (-1 , 2)]
- 5 A regular dice is rolled once, then the probability of getting an odd number and an even number together equals ($\frac{1}{2}$, 1 , 0 , $\frac{1}{4}$)
- 6 $\mathbb{R}_+ \cup \mathbb{R}_- =$ ($\mathbb{R}$, $\emptyset$, $[0 , \infty[$, $\mathbb{R}^*$)
- 7 If $n(x) = \frac{5x}{x-4}$, then the domain of n^{-1} is ({0 , 4} , $\mathbb{R} - \{0\}$, $\mathbb{R} - \{4\}$, $\mathbb{R} - \{0, 4\}$)
- 8 $2^x = 4$, then $8^{-x} =$ (64 , 16 , $\frac{1}{64}$, $\frac{1}{16}$)
- 9 If the expression: $x^2 + 4x + k$ is a perfect square, then $k =$ (2 , 4 , 8 , 16)

B Answer each of the following:

- 1 Find the solution set of the equation $x^2 - 5x + 2 = 0$ in $\mathbb{R}$ by using the general formula, rounding the result to two decimals.

.....

.....

- 2 Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:
 $y = x + 4$, $x + y = 4$

.....

.....

- 3 Find $n(x)$ in the simplest form, showing the domain of n where:

$$n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x - 3}{x^2 - 5x + 6}$$

- 4 If $n_1(x) = \frac{2x}{2x + 8}$, $n_2(x) = \frac{x^2 + 4x}{x^2 + 8x + 16}$, prove that $n_1 = n_2$

- 5 If A, B are two events of the sample space of a random experiment and $P(A) = 0.2$, $P(B) = P(B')$, $P(A \cap B) = 0.1$

Find: a. $P(A \cup B)$

b. $P(A - B)$

- 6 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations:

$$x = 2y \quad , \quad x^2 + y^2 = 5$$

- 7 If $\{-2, 2\}$ is the set of zeroes of $f : f(x) = x^2 + a$, find the value of a .

A Choose the correct answer:

- 1 The solution set of the inequality: $-1 < x < 4$ in $\mathbb{R}$ is
 ($[-1, 4]$, $] -1, 4]$, $\{-1, 4\}$, $] -1, 4[$)
- 2 If $X \subset Y$, then $P(X \cap Y) = \dots\dots\dots$
 (0 , $\emptyset$, $P(X)$, $P(Y)$)
- 3 The set of zeroes of f where $f(x) = -3x$ is
 ($\{0\}$, $\{1\}$, $\mathbb{R}$, $\{-3\}$)
- 4 If $3^{x+1} = 27$, then $x = \dots\dots\dots$
 (1 , 2 , 3 , 4)
- 5 The number of solutions of the two equations: $x + y = 1$, $5y + 5x = 3$ in $\mathbb{R} \times \mathbb{R}$ is
 (infinite , 0 , 1 , 2)
- 6 If $\frac{x+2}{x-4}$ is a rational number, then $x \neq \dots\dots\dots$
 (-2 , 2 , -4 , 4)
- 7 If A and B are two events of the sample space of a random experiment, $B \subset A$, then
 $P(A \cup B) = \dots\dots\dots$
 (A , B , $P(A)$, $P(B)$)
- 8 If $x^2 - y^2 = 35$, $x - y = 5$, then $x + y = \dots\dots\dots$
 (35 , 5 , 7 , 40)
- 9 The solution set of the two equations: $x + 4 = 0$, $y = 2$ in $\mathbb{R} \times \mathbb{R}$ is
 ($\{-4, 2\}$, $\{(-4, 2)\}$, $\mathbb{R}$, $\emptyset$)

B Answer each of the following:

- 1 Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$: $x = y + 8$, $x + y = 2$.

.....

.....

- 2 Find $n(y)$ in the simplest form, showing the domain of n where:

$$n(y) = \frac{y^2 - 9}{3y^2 + 9y} \div \frac{y^3 + y}{y^2 + 1}$$

.....

.....

- 3 If $n_1(x) = \frac{5x}{5x + 10}$, $n_2(x) = \frac{x^2 + 2x}{x^2 + 4x + 4}$, prove that $n_1 = n_2$

.....

.....

- 4 Find the value of each of a , b , given that $(3, -1)$ is a solution for the two equations:

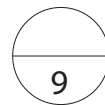
$$ax + by = 5, 3ax + by = 17$$

- 5 If A , B are two events of the sample space of a random experiment and $P(A) = \frac{1}{4}$, $P(B) = \frac{3}{8}$, $P(A \cap B) = \frac{1}{8}$, find $P(A \cup B)$.

- 6 Solve the following equation in $\mathbb{R}$ using the general rule, rounding the result to one decimal:

$$x^2 - x = 4$$

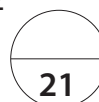
- 7 If $f : f(x) = \frac{x^2 + k}{x^2 - mx + 6}$, its domain is $\mathbb{R} - \{2, 3\}$, $f(4) = 9$, find the value of $m \times k$.



A Choose the correct answer:

- 1 If $x^2 + 12x + 32 = (x + L)(x + M)$, then $L + M = \dots\dots\dots$ (12 , 32 , 8 , 4)
- 2 The number of solutions of the two equations: $x + 2y = 3$, $2x + 4y - 6 = 0$ in $\mathbb{R} \times \mathbb{R}$ is $\dots\dots\dots$ (1 , 2 , 0 , infinite)
- 3 If $B \subset S$, $P(B) = P(B')$, then $P(B) = \dots\dots\dots$ (0 , 1 , $\frac{1}{4}$, $\frac{1}{2}$)
- 4 If $\sqrt[3]{64} = \sqrt{x}$, then $x = \dots\dots\dots$ (8 , 16 , 4 , 32)
- 5 If $6^{n-2} = \frac{1}{216}$, then $n = \dots\dots\dots$ (1 , -1 , 6 , -6)
- 6 The common domain of the two fractions $\frac{3x}{x-5}$ and $\frac{x}{x+2}$ is $\dots\dots\dots$ ($\{5, -2\}$, $\mathbb{R} - \{5, -2\}$, $\mathbb{R}$, $(-2, 5)$)
- 7 If $z(f) = \{-2\}$, $f(x) = x^3 - m$, then $m = \dots\dots\dots$ (8 , -8 , 2 , -2)
- 8 If $a^2 - b^2 = 48$, $a + b = 6$, then $a - b = \dots\dots\dots$ (54 , 6 , 8 , 48)
- 9 If A, B are two mutually exclusive events from the sample space of a random experiment, then $P(A \cap B) = \dots\dots\dots$ (0 , 1 , $\frac{1}{4}$, $\frac{1}{2}$)

B Answer each of the following:



- 1 Find the solution set of the equation: $x^2 - 4x + 2 = 0$ in $\mathbb{R}$ using the general formula.
.....
.....
- 2 Two positive real numbers, the difference between them is 1 and the sum of their squares is 25, find the two numbers.
.....
.....
- 3 Find $n(x)$ in the simplest form, showing the domain:

$$n(x) = \frac{2x^2 - x - 6}{x^2 - 3x} \div \frac{4x^2 - 9}{2x^2 - 3x}$$

.....
.....

- 4 If A, B are two events of the sample space of a random experiment,

$$P(A) = \frac{1}{3}, \text{ and } P(A \cup B) = \frac{7}{12}$$

, find the value of P(B) if :

a. A and B are mutually exclusive events

b. $A \subset B$

- 5 If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, prove that $n_1 = n_2$

- 6 Find in $\mathbb{R} \times \mathbb{R}$, the S.S. of the following equations:

$$2x - y = 3 \text{ , } x + 2y = 4$$

- 7 If $n(x) = \frac{x^2 - 2x}{x - 2}$

- Find a. $n^{-1}(x)$ in the simplest form, showing the domain.

b. If $n^{-1}(x) = \frac{1}{3}$, find the value of x.

A Choose the correct answer:

- 1 The number of solutions of the first degree equation in two variables is solution(s).
(0 , 1 , 2 , infinite)
- 2 If $\sqrt{36} = m\sqrt{4}$, then $m =$
(3 , 4 , 12 , 9)
- 3 If A , B are two mutually exclusive events from the sample space of a random experiment ,
 $P(A \cap B) =$
(0 , 1 , $\frac{1}{2}$, $\frac{1}{4}$)
- 4 The point of intersection of the two straight lines : $x - 2 = 0$ and $y = -1$ is
[(2 , -1) , (-2 , -1) , (2 , 1) , (-1 , 2)]
- 5 A regular dice is rolled once, then the probability of getting an odd number and an even number together equals
($\frac{1}{2}$, 1 , 0 , $\frac{1}{4}$)
- 6 $\mathbb{R}_+ \cup \mathbb{R}_- =$
($\mathbb{R}$, $\emptyset$, $[0, \infty[$, $\mathbb{R}^*$)
- 7 If $n(x) = \frac{5x}{x-4}$, then the domain of n^{-1} is
({0 , 4} , $\mathbb{R} - \{0\}$, $\mathbb{R} - \{4\}$, $\mathbb{R} - \{0, 4\}$)
- 8 $2^x = 4$, then $8^{-x} =$
(64 , 16 , $\frac{1}{64}$, $\frac{1}{16}$)
- 9 If the expression: $x^2 + 4x + k$ is a perfect square, then $k =$
(2 , 4 , 8 , 16)

B Answer each of the following:

- 1 Find the solution set of the equation $x^2 - 5x + 2 = 0$ in $\mathbb{R}$ by using the general formula, rounding the result to two decimals.

Answer

$$\therefore a = 1, b = -5$$

$$, c = 2$$

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\therefore x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 1 \times 2}}{2 \times 1}, \therefore x = \frac{5 \pm \sqrt{17}}{2}$$

$$\therefore x \simeq 4.56$$

$$\text{or } x \simeq 0.44$$

$$\therefore \text{The S.S.} = \{4.56, 0.44\}$$

- 2 Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$$y = x + 4, \quad x + y = 4$$

Answer

$$y = x + 4 \quad \dots\dots (1) \quad , \quad x + y = 4 \quad \dots\dots (2)$$

By substituting from (1) in (2):

$$\therefore x + (x + 4) = 4 \quad \therefore 2x + 4 = 4 \quad \therefore x = 0$$

$$\text{Substituting in (1): } y = x + 4 \quad \therefore y = 0 + 4 \quad \therefore y = 4$$

$$\therefore \text{The S.S.} = \{(0, 4)\}$$

- 3 Find $n(x)$ in the simplest form, showing the domain of n where:

$$n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x - 3}{x^2 - 5x + 6}$$

Answer

$$\therefore n(x) = \frac{x(x+2)}{(x-2)(x+2)} + \frac{x-3}{(x-2)(x-3)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{2, -2, 3\}$$

$$\therefore n(x) = \frac{x(x+2)}{(x-2)(x+2)} + \frac{x-3}{(x-2)(x-3)}$$

$$\therefore n(x) = \frac{x}{(x-2)} + \frac{1}{(x-2)}$$

$$\therefore n(x) = \frac{x+1}{(x-2)}$$

- 4 If $n_1(x) = \frac{2x}{2x+8}$, $n_2(x) = \frac{x^2+4x}{x^2+8x+16}$, prove that $n_1 = n_2$

Answer

$$\therefore n_1(x) = \frac{2x}{2x+8} \quad \therefore n_1(x) = \frac{x}{x+4}$$

$$\therefore \text{The domain} = \mathbb{R} - \{-4\}$$

$$\therefore n_2(x) = \frac{x^2+4x}{x^2+8x+16}$$

$$\therefore n_2(x) = \frac{x(x+4)}{(x+4)(x+4)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{-4\}$$

$$\therefore n_1(x) = \frac{x}{x+4} \quad , \quad n_2(x) = \frac{x}{x+4}$$

$$\therefore n_1 = n_2$$

- 5 If A, B are two events of the sample space of a random experiment and $P(A) = 0.2$, $P(B) = P(B')$, $P(A \cap B) = 0.1$

Find: a. $P(A \cup B)$

b. $P(A - B)$

Answer

a. $\because P(B) = P(B')$, $P(B) + P(B') = 1$ $\therefore P(B) = 0.5$

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

$\therefore P(A \cup B) = 0.2 + 0.5 - 0.1 = 0.6$

b. $\because P(A - B) = P(A) - P(A \cap B)$. $\therefore P(A - B) = 0.2 - 0.1 = 0.1$

- 6 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations:

$x = 2y$, $x^2 + y^2 = 5$

Answer

$x = 2y$ (1), $x^2 + y^2 = 5$ (2)

By substituting from (1) in (2):

$\therefore (2y)^2 + y^2 = 5$ $\therefore 4y^2 + y^2 = 5$ $\therefore 5y^2 = 5$

$\therefore y = 1$ or $y = -1$

Substituting in (1)

$\therefore x = 2$ or $x = -2$

$\therefore$ The S.S. = $\{(-2, -1), (2, 1)\}$

- 7 If $\{-2, 2\}$ is the set of zeroes of $f : f(x) = x^2 + a$, find the value of a.

Answer

$\because \{-2, 2\}$ is the set of zeroes of the function

$\therefore f(2) = 0$ $\therefore 2^2 + a = 0$ $\therefore a = -4$

A Choose the correct answer:

- 1 The solution set of the inequality: $-1 < x < 4$ in $\mathbb{R}$ is
 ($[-1, 4]$, $] -1, 4]$, $\{-1, 4\}$, $] -1, 4[$)
- 2 If $X \subset Y$, then $P(X \cap Y) = \dots\dots\dots$
 (0 , $\emptyset$, $P(X)$, $P(Y)$)
- 3 The set of zeroes of f where $f(x) = -3x$ is
 ($\{0\}$, $\{1\}$, $\mathbb{R}$, $\{-3\}$)
- 4 If $3^{x+1} = 27$, then $x = \dots\dots\dots$
 (1 , 2 , 3 , 4)
- 5 The number of solutions of the two equations: $x + y = 1$, $5y + 5x = 3$ in $\mathbb{R} \times \mathbb{R}$ is
 (infinite , 0 , 1 , 2)
- 6 If $\frac{x+2}{x-4}$ is a rational number, then $x \neq \dots\dots\dots$
 (-2 , 2 , -4 , 4)
- 7 If A and B are two events of the sample space of a random experiment, $B \subset A$, then $P(A \cup B) = \dots\dots\dots$
 (A , B , $P(A)$, $P(B)$)
- 8 If $x^2 - y^2 = 35$, $x - y = 5$, then $x + y = \dots\dots\dots$
 (35 , 5 , 7 , 40)
- 9 The solution set of the two equations: $x + 4 = 0$, $y = 2$ in $\mathbb{R} \times \mathbb{R}$ is
 ($\{-4, 2\}$, $\{(-4, 2)\}$, $\mathbb{R}$, $\emptyset$)

B Answer each of the following:

- 1 Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$: $x = y + 8$, $x + y = 2$.

Answer

$$x = y + 8 \dots\dots\dots(1) \quad , \quad x + y = 2 \dots\dots\dots(2)$$

By substituting from (1) in (2):

$$\therefore (y + 8) + y = 2 \quad \therefore 2y + 8 = 2 \quad \therefore 2y = -6$$

$$\therefore y = -3$$

$$\text{Substituting in (2):} \quad \therefore x + y = 2 \quad \therefore x + (-3) = 2 \quad \therefore x = 5$$

$$\therefore \text{The S.S.} = \{(5, -3)\}$$

- 2 Find $n(y)$ in the simplest form, showing the domain of n where:

$$n(y) = \frac{y^2 - 9}{3y^2 + 9y} \div \frac{y^3 + y}{y^2 + 1}$$

Answer

$$n(y) = \frac{y^2 - 9}{3y^2 + 9y} \div \frac{y^3 + y}{y^2 + 1}$$

$$n(y) = \frac{(y+3)(y-3)}{3y(y+3)} \div \frac{y(y^2+1)}{y^2+1}$$

$$\therefore \text{The domain} = \mathbb{R} - \{0, -3\}$$

$$\therefore n(y) = \frac{y-3}{3y} \div \frac{y}{1}$$

$$\therefore n(y) = \frac{y-3}{3y} \times \frac{1}{y}$$

$$\therefore n(y) = \frac{y-3}{3y^2}$$

- 3 If $n_1(x) = \frac{5x}{5x+10}$, $n_2(x) = \frac{x^2+2x}{x^2+4x+4}$, prove that $n_1 = n_2$

Answer

$$\therefore n_1(x) = \frac{5x}{5x+10}$$

$$\therefore \text{The domain} = \mathbb{R} - \{-2\}$$

$$\therefore n_2(x) = \frac{x^2+2x}{x^2+4x+4}$$

$$\therefore \text{The domain} = \mathbb{R} - \{-2\}$$

$$\therefore n_1(x) = \frac{x}{x+2}, \quad n_2(x) = \frac{x}{x+2}$$

$$\therefore n_1 = n_2$$

$$\therefore n_1(x) = \frac{5x}{5(x+2)}$$

$$\therefore n_2(x) = \frac{x(x+2)}{(x+2)(x+2)}$$

- 4 Find the value of each of a, b , given that $(3, -1)$ is a solution for the two equations:

$$ax + by = 5, \quad 3ax + by = 17$$

Answer

$$\therefore (3, -1) \text{ is a solution for the two equations}$$

$$\therefore 3a - b = 5 \dots\dots (1), \quad 9a - b = 17 \dots\dots (2)$$

By subtracting (1) from (2):

$$\therefore 6a = 12$$

$$\therefore a = 2$$

Substituting in (1):

$$\therefore b = 1$$

- 5 If A, B are two events of the sample space of a random experiment and $P(A) = \frac{1}{4}$, $P(B) = \frac{3}{8}$, $P(A \cap B) = \frac{1}{8}$, find $P(A \cup B)$.

Answer

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{1}{4} + \frac{3}{8} - \frac{1}{8}$$

$$= \frac{1}{2}$$

- 6 Solve the following equation in $\mathbb{R}$ using the general rule, rounding the result to one decimal:

$$x^2 - x = 4$$

Answer

$$\therefore x^2 - x - 4 = 0 \quad \therefore a = 1, b = -1, c = -4$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \therefore x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \times 1 \times -4}}{2 \times 1}, \quad \therefore x = \frac{1 \pm \sqrt{17}}{2}$$

$$\therefore x \simeq 2.6 \quad \text{or} \quad x \simeq -1.6$$

$$\therefore \text{The S.S.} = \{2.6, -1.6\}$$

- 7 If $f : f(x) = \frac{x^2 + k}{x^2 - mx + 6}$, its domain is $\mathbb{R} - \{2, 3\}$, $f(4) = 9$, find the value of $m \times k$.

Answer

$$\therefore \text{The domain is } \mathbb{R} - \{2, 3\}$$

$$\therefore \text{At } x = 2$$

$$\therefore x^2 - mx + 6 = 0$$

$$\therefore (2)^2 - 2m + 6 = 0$$

$$\therefore 2m = 10$$

$$\therefore m = 5$$

$$\therefore f(4) = 9$$

$$\therefore 9 = \frac{(4)^2 + k}{(4)^2 - 4 \times 5 + 6}$$

$$\therefore 9 = \frac{16 + k}{2}$$

$$\therefore 18 = 16 + k$$

$$\therefore k = 2$$

$$\therefore m \times k = 2 \times 5 = 10$$

A Choose the correct answer:

- 1 If $x^2 + 12x + 32 = (x + L)(x + M)$, then $L + M = \dots\dots\dots$ (12 , 32 , 8 , 4)
- 2 The number of solutions of the two equations: $x + 2y = 3$, $2x + 4y - 6 = 0$ in $\mathbb{R} \times \mathbb{R}$ is
(1 , 2 , 0 , infinite)
- 3 If $B \subset S$, $P(B) = P(B')$, then $P(B) = \dots\dots\dots$ (0 , 1 , $\frac{1}{4}$, $\frac{1}{2}$)
- 4 If $\sqrt[3]{64} = \sqrt{x}$, then $x = \dots\dots\dots$ (8 , 16 , 4 , 32)
- 5 If $6^{n-2} = \frac{1}{216}$, then $n = \dots\dots\dots$ (1 , -1 , 6 , -6)
- 6 The common domain of the two fractions $\frac{3x}{x-5}$ and $\frac{x}{x+2}$ is
({5, -2} , $\mathbb{R} - \{5, -2\}$, $\mathbb{R}$, (-2, 5))
- 7 If $z(f) = \{-2\}$, $f(x) = x^3 - m$, then $m = \dots\dots\dots$
(8 , -8 , 2 , -2)
- 8 If $a^2 - b^2 = 48$, $a + b = 6$, then $a - b = \dots\dots\dots$ (54 , 6 , 8 , 48)
- 9 If A, B are two mutually exclusive events from the sample space of a random experiment, then $P(A \cap B) = \dots\dots\dots$ (0 , 1 , $\frac{1}{4}$, $\frac{1}{2}$)

B Answer each of the following:

- 1 Find the solution set of the equation: $x^2 - 4x + 2 = 0$ in $\mathbb{R}$ using the general formula.

Answer

$$a = 1, b = -4, c = 2$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \therefore x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times 1 \times 2}}{2 \times 1}, \quad \therefore x = \frac{4 \pm 2\sqrt{2}}{2}$$

$$\therefore x = 2 \pm \sqrt{2}$$

$$\therefore x \simeq 2 + \sqrt{2} \quad \text{or} \quad x \simeq 2 - \sqrt{2}$$

$$\therefore \text{The S.S.} = \{2 + \sqrt{2}, 2 - \sqrt{2}\}$$

- 2 Two positive real numbers, the difference between them is 1 and the sum of their squares is 25, find the two numbers.

Answer

Let the numbers be x and y .

$$x - y = 1 \dots\dots\dots (1)$$

$$x^2 + y^2 = 25 \dots\dots\dots (2)$$

$$x = y + 1 \dots\dots\dots (3)$$

By substituting from (3) in (2):

$$(y + 1)^2 + y^2 = 25$$

$$y^2 + 2y + 1 + y^2 - 25 = 0$$

$$2y^2 + 2y - 24 = 0$$

$$2(y^2 + y - 12) = 0$$

$$(y + 4)(y - 3) = 0$$

$$y = -4 \text{ (refused)} \quad \text{or} \quad y = 3$$

by substituting in (3)

$$x = 3 + 1 \quad \therefore x = 4, \text{ then the two numbers are 3 and 4.}$$

- 3 Find $n(x)$ in the simplest form, showing the domain:

$$n(x) = \frac{2x^2 - x - 6}{x^2 - 3x} \div \frac{4x^2 - 9}{2x^2 - 3x}$$

Answer

$$\therefore n(x) = \frac{(2x + 3)(x - 2)}{x(x - 3)} \div \frac{(2x + 3)(2x - 3)}{x(2x - 3)}$$

$$\therefore n(x) = \frac{(2x + 3)(x - 2)}{x(x - 3)} \times \frac{x(2x - 3)}{(2x + 3)(2x - 3)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{0, 3, \frac{3}{2}, -\frac{3}{2}\}$$

$$\therefore n(x) = \frac{(2x + 3)(x - 2)}{x(x - 3)} \times \frac{x(2x - 3)}{(2x + 3)(2x - 3)}$$

$$\therefore n(x) = \frac{x - 2}{x - 3}$$

- 4 If A, B are two events of the sample space of a random experiment,

$$P(A) = \frac{1}{3}, \text{ and } P(A \cup B) = \frac{7}{12}$$

, find the value of $P(B)$ if :

a. A and B are mutually exclusive events

b. $A \subset B$

Answer

a. If A and B are mutually exclusive events, then $P(A \cap B) = 0$

$$P(A \cup B) = P(A) + P(B)$$

$$\frac{7}{12} = \frac{1}{3} + P(B) \quad \therefore P(B) = \frac{7}{12} - \frac{1}{3} = \frac{1}{4}$$

b. If $A \subset B$, then $P(B) = P(A \cup B)$

$$\therefore P(B) = \frac{7}{12}$$

- 5 If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, prove that $n_1 = n_2$

Answer

$$\therefore n_1(x) = \frac{x^2}{x^2(x-1)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{0, 1\}$$

$$\therefore n_1(x) = \frac{1}{(x-1)}$$

$$\therefore n_2(x) = \frac{x(x^2 + x + 1)}{x(x-1)(x^2 + x + 1)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{0, 1\}$$

$$\therefore n_2(x) = \frac{1}{(x-1)}$$

$$\therefore n_1(x) = \frac{1}{(x-1)} , n_2(x) = \frac{1}{(x-1)}$$

$$\therefore n_1 = n_2$$

- 6 Find in $\mathbb{R} \times \mathbb{R}$, the S.S. of the following equations:

$$2x - y = 3 , x + 2y = 4$$

Answer

$$2x - y = 3 \dots (1)$$

$$, x + 2y = 4 \dots (2)$$

$$x = 4 - 2y \dots (3)$$

By Substituting (3) in (1):

$$\therefore 2(4 - 2y) - y = 3$$

$$\therefore 8 - 4y - y = 3$$

$$\therefore -5y = -5$$

$$\therefore y = 1$$

Substituting in (3)

$$\therefore x = 4 - 2(1)$$

$$\therefore x = 2$$

$$\therefore \text{The S.S.} = \{(2, 1)\}$$

- 7 If $n(x) = \frac{x^2 - 2x}{x - 2}$

- Find a. $n^{-1}(x)$ in the simplest form, showing the domain.

b. If $n^{-1}(x) = \frac{1}{3}$, find the value of x .

Answer

a. If $n(x) = \frac{x^2 - 2x}{x - 2}$, then $n^{-1}(x) = \frac{x - 2}{x^2 - 2x} = \frac{x - 2}{x(x - 2)}$

The domain of $n^{-1}(x) = \mathbb{R} - \{0, 2\}$

$$\therefore n^{-1}(x) = \frac{1}{x}$$

b. If $n^{-1}(x) = \frac{1}{3}$

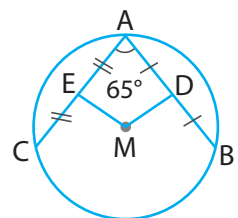
$$\frac{1}{3} = \frac{1}{x} , \text{ then } x = 3$$

A Choose the correct answer:

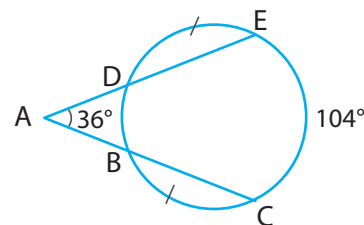
- 1 The parallelogram in which the two diagonals are equal in length is called
(a square , a rectangle , a trapezium , a rhombus)
- 2 The point of concurrence of the medians of the triangle divides each median by the ratio from vertex. (1 : 2 , 1 : 3 , 2 : 1 , 3 : 1)
- 3 If the projection of a line segment on a straight line is a point, then the line segment is to the straight line. (// , $\perp$, $\in$, $\subset$)
- 4 XYZL is a cyclic quadrilateral in which $m(\angle X) = 2 m(\angle Z)$, then $m(\angle Z) = \dots\dots\dots^\circ$.
(60 , 45 , 90 , 120)
- 5 The sum of the measures of the interior angles of a quadrilateral equals $^\circ$.
(180 , 360 , 270 , 540)
- 6 If $AB = 8$ cm, then the circumference of the smallest circle passing through the two points A and B equals cm.
(16π , 10π , 8π , 64π)
- 7 The width of a rectangle is 6 cm and its diagonal length is 10 cm, then its length is cm.
(60 , 16 , 8 , 120)
- 8 If the lengths of two adjacent sides of a parallelogram are 7 cm, 9 cm, then the perimeter of this parallelogram is cm. (16 , 32 , 63 , 36)
- 9 If ABC is a triangle in which $m(\angle B) = m(\angle C) = 60^\circ$, then the number of its symmetrical axes equals
(0 , 1 , 2 , 3)

B Answer each of the following:

- 1 In the opposite figure: $\overline{AB}$, $\overline{AC}$ are two chords in a circle M,
D, E are the two midpoints of $\overline{AB}$, $\overline{AC}$, $m(\angle BAC) = 65^\circ$.
Find: $m(\angle DME)$



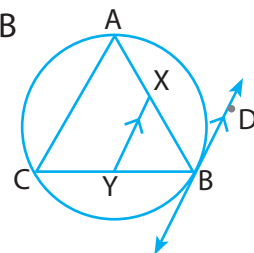
- 2 In the opposite figure: $m(\angle A) = 36^\circ$, $m(\widehat{EC}) = 104^\circ$,
 $m(\widehat{BC}) = m(\widehat{DE})$.
 Find: $m(\widehat{BD})$, $m(\widehat{DE})$



- 3 In the opposite figure:

ABC is a triangle inscribed in a circle; $\overleftrightarrow{BD}$ is a tangent to the circle at B
 $X \in \overline{AB}$, $Y \in \overline{BC}$, where $\overleftrightarrow{XY} \parallel \overleftrightarrow{BD}$,

Prove that: AXYC is a cyclic quadrilateral.



- 4 If M is a circle with radius length 10 cm, $\overleftrightarrow{MA} \perp$ straight line L, where $A \in$ straight line L, determine the position of the straight line L with respect to the circle M in each of the following cases:

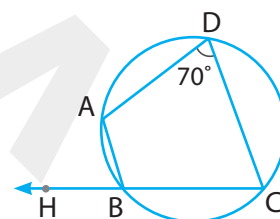
1- $MA = 9$ cm

2- $MA = 10$ cm

3- $MA = 12$ cm

- 5 Complete: In the opposite figure:

- If $m(\angle ADC) = 70^\circ$, then $m(\angle ABH) = \dots\dots\dots^\circ$

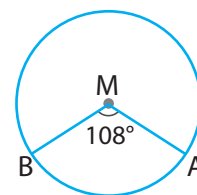


- 6 In the opposite figure:

M is a circle with radius length 5 cm.

$m(\angle AMB) = 108^\circ$

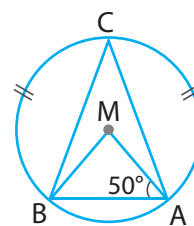
Find: The length of $\widehat{AB}$ ($\pi = 3.14$)



- 7 In the opposite figure:

A circle M, $m(\widehat{AC}) = m(\widehat{BC})$, and $m(\angle MAB) = 50^\circ$

Find with proof: 1- $m(\angle C)$ 2- $m(\widehat{AC})$

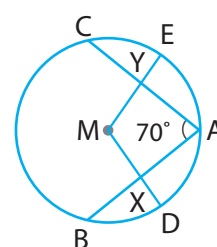


A Choose the correct answer:

- 1 ABCD is a cyclic quadrilateral in which $m(\angle A) = 4 m(\angle C)$, then $m(\angle C) = \dots\dots\dots^\circ$.
(36 , 180 , 90 , 150)
- 2 The measure of the reflex angle of the angle whose measure is 130° equals $\dots\dots\dots^\circ$.
(360 , 330 , 320 , 230)
- 3 Two circles, the lengths of their radii are 5 cm, 9 cm, are touching when the distance between their centers $\in \dots\dots\dots$.
($]0, 4[$, $\{4, 14\}$, $]4, \infty[$, $]4, 14[$)
- 4 The circumference of the circle whose diameter length is 10 cm equals $\dots\dots\dots$.
(4π , 10π , 8π , 12π)
- 5 The number of altitudes of the isosceles triangle is $\dots\dots\dots$.
(0 , 1 , 2 , 3)
- 6 ABCD is a rhombus, then the number of circles that pass through the vertices A, B, C is $\dots\dots\dots$.
(0 , 1 , 2 , infinite)
- 7 If the straight line L is a tangent to the circle M of a diameter length 12 cm, then the distance between straight line L and the center of the circle equals $\dots\dots\dots$ cm.
(12 , 6 , 8 , 4)
- 8 ABCD is a cyclic quadrilateral, $m(\angle A) = 120^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$.
(60 , 120 , 180 , 240)
- 9 In ΔABC , if $(AC)^2 = (AB)^2 + (BC)^2$, then $(\angle B)$ is a/an $\dots\dots\dots$ angle.
(acute , right , obtuse , straight)

B Answer each of the following:

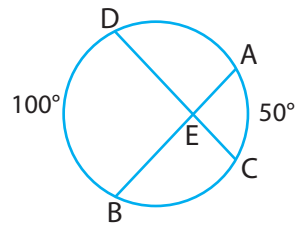
- 1 In the opposite figure: $\overline{AB}$, $\overline{AC}$ are two chords in the circle M,
X, Y are midpoints of $\overline{AB}$, $\overline{AC}$ respectively, $m(\angle CAB) = 70^\circ$
a- Find: $m(\angle DME)$
b- If $XD = YE$, prove that: $AB = AC$



- 2 In the opposite figure:

$$\overline{AB} \cap \overline{CD} = \{E\}, m(\widehat{AC}) = 50^\circ, m(\widehat{BD}) = 100^\circ$$

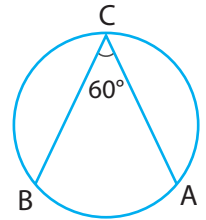
Find: $m(\angle AEC)$



- 3 Complete:

In the opposite figure:

If $m(\angle ACB) = 60^\circ$, then the length of $(\widehat{AB}) = \dots\dots\dots$

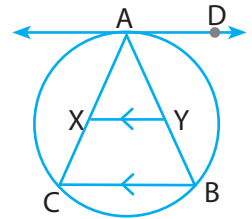


- 4 In the opposite figure:

ABC is a triangle inscribed in a circle,

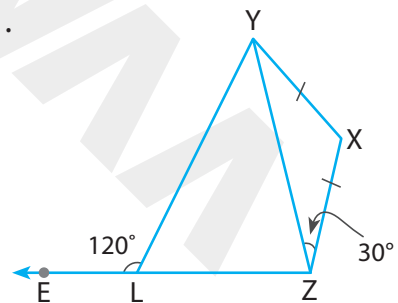
$\overleftrightarrow{AD}$ is a tangent to the circle at A, $\overline{XY} \parallel \overline{BC}$

Prove that: $\overleftrightarrow{AD}$ is a tangent to the circle passing through the points A, X, Y.



- 5 $XY = XZ$, $m(\angle XZY) = 30^\circ$, $m(\angle ELY) = 120^\circ$, where $E \in \overleftrightarrow{ZL}$.

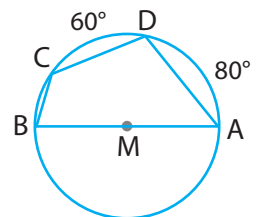
Prove that: YXZL is a cyclic quadrilateral.



- 6 In the opposite figure:

$m(\widehat{AD}) = 80^\circ$, $m(\widehat{DC}) = 60^\circ$, $\overline{AB}$ is a diameter of the circle M.

Find the measure of the interior angles of the figure ABCD.



- 7 Two circles M and N with radii lengths 9 cm and 4 cm respectively. Show the position of each of them with respect to the other in each of the following cases:

a. $MN = 12$ cm

b. $MN = 5$ cm

c. $MN = 4$ cm

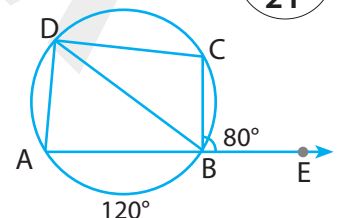
A Choose the correct answer:

- 1 The point of concurrence of the medians of the triangle divides each median by the ratio from base. (1 : 2 , 1 : 3 , 2 : 1 , 3 : 1)
- 2 The number of symmetry axes of any circle is (0 , 2 , 3 , an infinite number)
- 3 In $\triangle ABC$, if $(AC)^2 = (AB)^2 + (BC)^2$, $m(\angle C) = 50^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$. (50 , 90 , 40 , 45)
- 4 If the lengths of two adjacent sides of a parallelogram are 4 cm, 6 cm, then the perimeter of this parallelogram is cm. (24 , 12 , 20 , 8)
- 5 The length of the diagonal of a square is 5 cm, then its surface area = cm^2 . (25 , 5 , 12.5 , 20)
- 6 If the quadrilateral XYZL is a cyclic quadrilateral: then $m(\angle Y) + m(\angle L) = \dots\dots\dots$ (90° , 120° , 360° , 180°)
- 7 If $m(\angle A) = 120^\circ$, then $m(\text{reflex } \angle A) = \dots\dots\dots$ (220° , 360° , 240° , 180°)
- 8 The two similar triangles are congruent, then the enlargement ratio equals (0 , 1 , 2 , otherwise)
- 9 The parallelogram in which the two diagonals are perpendicular is called (a square , a rectangle , a trapezium , a rhombus)

B Answer each of the following:

- 1 $E \in \overrightarrow{AB}$, $E \notin (\overline{AB})$, $m(\widehat{AB}) = 120^\circ$, $m(\angle CBE) = 80^\circ$,

Find with proof: $m(\angle BDC)$.

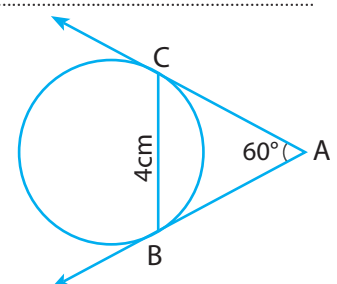


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- 2 Complete:

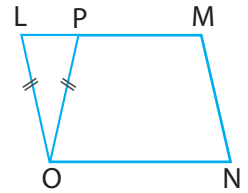
In the opposite figure:

$\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents, then the perimeter of $\triangle ABC$ is cm.



- 3 LMNO is a parallelogram, $OP = OL$

Prove that: MNOP is a cyclic quadrilateral.



- 4 If M is a circle with radius length 18 cm., $\overleftrightarrow{MN} \perp$ straight line S, where $N \in$ straight line S, determine the position of the straight line S with respect to the circle M in each of the following cases:

1. $MN = 13$ cm

2. $MN = 18$ cm

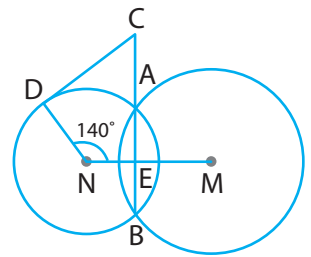
3. $MN = 20$ cm

- 5 In the opposite figure:

M, N are two intersecting circles at A, B,

$\overline{CD}$ is a tangent segment to the circle N, $C \in \overline{BA}$

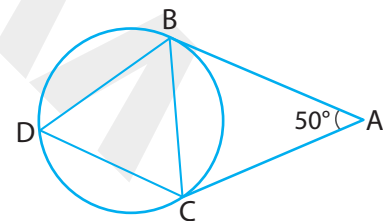
, $m(\angle MND) = 140^\circ$, find $m(\angle DCE)$.



- 6 In the opposite figure:

$\overline{AB}$ and $\overline{AC}$ are two tangent segments to the circle at B, C

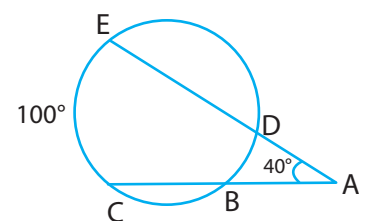
, and $m(\angle A) = 50^\circ$, find with proof $m(\angle D)$.



- 7 In the opposite figure:

$m(\angle A) = 40^\circ$, $m(\widehat{EC}) = 100^\circ$,

find with proof: $m(\widehat{BD})$

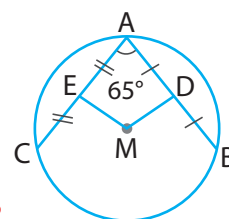


A Choose the correct answer:

- 1 The parallelogram in which the two diagonals are equal in length is called
(a square , a rectangle , a trapezium , a rhombus)
- 2 The point of concurrence of the medians of the triangle divides each median by the ratio from vertex.
(1 : 2 , 1 : 3 , 2 : 1 , 3 : 1)
- 3 If the projection of a line segment on a straight line is a point, then the line segment is to the straight line.
(// , $\perp$, $\in$, $\subset$)
- 4 XYZL is a cyclic quadrilateral in which $m(\angle X) = 2 m(\angle Z)$, then $m(\angle Z) = \dots\dots\dots^\circ$.
(60 , 45 , 90 , 120)
- 5 The sum of the measures of the interior angles of a quadrilateral equals $^\circ$.
(180 , 360 , 270 , 540)
- 6 If $AB = 8$ cm, then the circumference of the smallest circle passing through the two points A and B equals cm.
(16π , 10π , 8π , 64π)
- 7 The width of a rectangle is 6 cm and its diagonal length is 10 cm, then its length is cm.
(60 , 16 , 8 , 120)
- 8 If the lengths of two adjacent sides of a parallelogram are 7 cm, 9 cm, then the perimeter of this parallelogram is cm.
(16 , 32 , 63 , 36)
- 9 If ABC is a triangle in which $m(\angle B) = m(\angle C) = 60^\circ$, then the number of its symmetrical axes equals
(0 , 1 , 2 , 3)

B Answer each of the following:

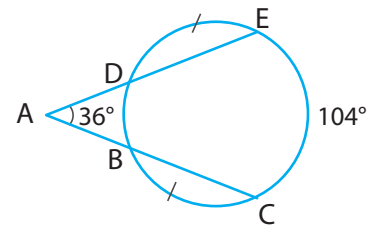
- 1 In the opposite figure: $\overline{AB}$, $\overline{AC}$ are two chords in a circle M,
D, E are the two midpoints of $\overline{AB}$, $\overline{AC}$, $m(\angle BAC) = 65^\circ$.
Find: $m(\angle DME)$



Answer

$$\begin{aligned} \because E \text{ is midpoint of } \overline{AC} & \therefore \overline{ME} \perp \overline{AC} , m(\angle AEM) = 90^\circ \\ \because D \text{ is midpoint of } \overline{AB} & \therefore \overline{MD} \perp \overline{AB} , m(\angle ADM) = 90^\circ \\ \therefore m(\angle DME) &= 360^\circ - (90^\circ + 90^\circ + 65^\circ) = 115^\circ \end{aligned}$$

- 2 In the opposite figure: $m(\angle A) = 36^\circ$, $m(\widehat{EC}) = 104^\circ$,
 $m(\widehat{BC}) = m(\widehat{DE})$.
 Find: $m(\widehat{BD})$, $m(\widehat{DE})$

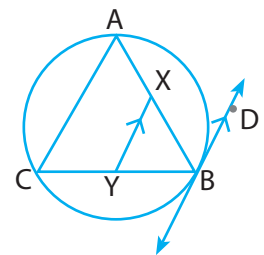


Answer

$$\begin{aligned} \therefore m(\angle A) &= \frac{1}{2} [m(\widehat{EC}) - m(\widehat{BD})] \\ \therefore 36^\circ &= \frac{1}{2} [104^\circ - m(\widehat{BD})] \quad \therefore m(\widehat{BD}) = 32^\circ \\ \therefore m(\widehat{DE}) &= m(\widehat{BC}) = \frac{360^\circ - (104^\circ + 32^\circ)}{2} = 112^\circ \end{aligned}$$

- 3 In the opposite figure:

ABC is a triangle inscribed in a circle; $\overleftrightarrow{BD}$ is a tangent to the circle at B
 $X \in \overline{AB}$, $Y \in \overline{BC}$, where $\overline{XY} \parallel \overleftrightarrow{BD}$,
 Prove that: AXYC is a cyclic quadrilateral.



Answer

$$\begin{aligned} \therefore \overline{XY} \parallel \overleftrightarrow{BD}, \text{ and } \overline{AB} \text{ is transversal.} \\ \therefore m(\angle DBX) &= m(\angle BXY) \text{ (alternate angles)} \\ \therefore m(\angle C) \text{ (inscribed)} &= m(\angle ABD) \text{ (tangency)} \quad \therefore m(\angle C) = m(\angle BXY) \\ \therefore \text{AXYC is a cyclic quadrilateral.} \end{aligned}$$

- 4 If M is a circle with radius length 10 cm, $\overleftrightarrow{MA} \perp$ straight line L, where $A \in$ straight line L, determine the position of the straight line L with respect to the circle M in each of the following cases:

1- $MA = 9$ cm

2- $MA = 10$ cm

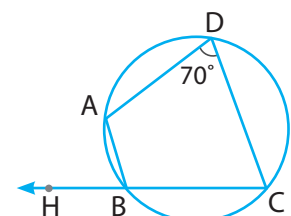
3- $MA = 12$ cm

Answer

$$\begin{aligned} \therefore MA &= 9 \text{ cm} < r \\ \therefore \text{straight line L is a secant to the circle M.} \\ \therefore MA &= 10 \text{ cm} = r \\ \therefore \text{straight line L is a tangent to the circle M.} \\ \therefore MA &= 12 \text{ cm} > r \\ \therefore \text{straight line L is outside to the circle M.} \end{aligned}$$

- 5 Complete: In the opposite figure:

– If $m(\angle ADC) = 70^\circ$, then $m(\angle ABH) = \dots\dots 70 \dots\dots^\circ$

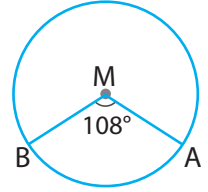


6 In the opposite figure:

M is a circle with radius length 5 cm.

$$m(\angle AMB) = 108^\circ$$

Find: The length of $\widehat{AB}$ ($\pi = 3.14$)



Answer

$$\because m(\widehat{AB}) = m(\angle M) = 108^\circ$$

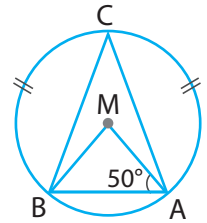
$$\text{The length of } \widehat{AB} = \frac{m(\widehat{AB})}{360^\circ} \times 2\pi r$$

$$= \frac{108^\circ}{360^\circ} \times 2 \times 3.14 \times 5 = 9.42 \text{ cm}$$

7 In the opposite figure:

A circle M, $m(\widehat{AC}) = m(\widehat{BC})$, and $m(\angle MAB) = 50^\circ$

Find with proof: 1- $m(\angle C)$ 2- $m(\widehat{AC})$



Answer

$$\because \text{In } \triangle ABC, MA = MB = r$$

$$\therefore m(\angle MAB) = m(\angle MBA) = 50^\circ \quad \therefore m(\angle AMB) = 180^\circ - (50^\circ + 50^\circ) = 80^\circ$$

$$\therefore m(\angle C) = \frac{1}{2} m(\angle AMB) = 40^\circ \text{ (inscribed and central angles are subtended by } \widehat{AB})$$

$$\because m(\widehat{AB}) = m(\angle AMB) = 80^\circ$$

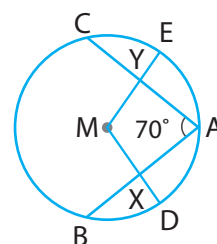
$$\therefore m(\widehat{AC}) = \frac{360^\circ - 80^\circ}{2} = 140^\circ$$

A Choose the correct answer:

- 1 ABCD is a cyclic quadrilateral in which $m(\angle A) = 4 m(\angle C)$, then $m(\angle C) = \dots\dots\dots^\circ$.
(36 , 180 , 90 , 150)
- 2 The measure of the reflex angle of the angle whose measure is 130° equals $\dots\dots\dots^\circ$.
(360 , 330 , 320 , 230)
- 3 Two circles, the lengths of their radii are 5 cm, 9 cm, are touching when the distance between their centers $\in \dots\dots\dots$.
($]0, 4[$, {4, 14} , $]4, \infty [$, $]4, 14[$)
- 4 The circumference of the circle whose diameter length is 10 cm equals $\dots\dots\dots$.
(4π , 10π , 8π , 12π)
- 5 The number of altitudes of the isosceles triangle is $\dots\dots\dots$.
(0 , 1 , 2 , 3)
- 6 ABCD is a rhombus, then the number of circles that pass through the vertices A, B, C is $\dots\dots\dots$.
(0 , 1 , 2 , infinite)
- 7 If the straight line L is a tangent to the circle M of a diameter length 12 cm, then the distance between straight line L and the center of the circle equals $\dots\dots\dots$ cm.
(12 , 6 , 8 , 4)
- 8 ABCD is a cyclic quadrilateral, $m(\angle A) = 120^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$.
(60 , 120 , 180 , 240)
- 9 In ΔABC , if $(AC)^2 = (AB)^2 + (BC)^2$, then $(\angle B)$ is a/an $\dots\dots\dots$ angle.
(acute , right , obtuse , straight)

B Answer each of the following :

- 1 In the opposite figure: $\overline{AB}$, $\overline{AC}$ are two chords in the circle M,
X, Y are midpoints of $\overline{AB}$, $\overline{AC}$ respectively, $m(\angle CAB) = 70^\circ$
a- Find: $m(\angle DME)$
b- If $XD = YE$, prove that: $AB = AC$



Answer

$\therefore Y$ is midpoint of $\overline{AC}$

$\therefore \overline{ME} \perp \overline{AC}$

, $m(\angle AYM) = 90^\circ$

X is midpoint of $\overline{AB}$

$\therefore \overline{MD} \perp \overline{AB}$

, $m(\angle AXM) = 90^\circ$

$\therefore m(\angle DME) = 360^\circ - (90^\circ + 90^\circ + 70^\circ) = 110^\circ$

$\therefore ME = MD = r$, $XD = YE$

$\therefore MY = MX$ $\therefore AB = AC$

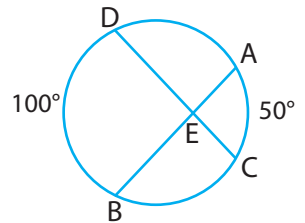
2 In the opposite figure:

$\overline{AB} \cap \overline{CD} = \{E\}$, $m(\widehat{AC}) = 50^\circ$, $m(\widehat{BD}) = 100^\circ$

Find: $m(\angle AEC)$

Answer

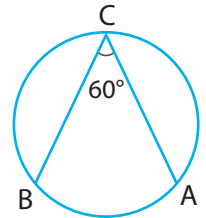
$$\begin{aligned} m(\angle AEC) &= \frac{1}{2} [m(\widehat{BD}) + m(\widehat{AC})] \\ &= \frac{1}{2} [100^\circ + 50^\circ] = 75^\circ \end{aligned}$$



3 Complete:

In the opposite figure:

If $m(\angle ACB) = 60^\circ$, then the length of $(\widehat{AB}) = \dots \frac{2}{3} \pi r \dots$

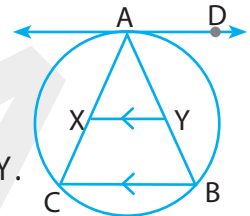


4 In the opposite figure:

ABC is a triangle inscribed in a circle,

$\overleftrightarrow{AD}$ is a tangent to the circle at A, $\overline{XY} \parallel \overline{BC}$

Prove that: $\overleftrightarrow{AD}$ is a tangent to the circle passing through the points A, X, Y.



Answer

$\therefore \overline{XY} \parallel \overline{BC}$ and $\overleftrightarrow{AC}$ is a transversal

$\therefore m(\angle AXY) = m(\angle C)$ (corresponding angles) (1)

$\therefore m(\angle C)$ (inscribed) = $m(\angle BAD)$ (tangency) (2)

From (1) and (2)

$\therefore m(\angle AXY) = m(\angle BAD)$

$\therefore \overleftrightarrow{AD}$ is a tangent to the circle passing through the points A, X, Y.

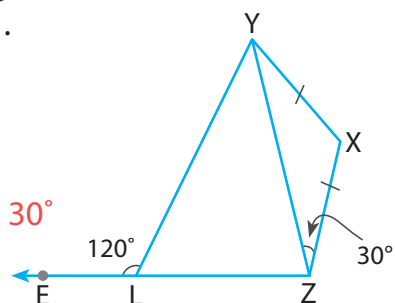
5 $XY = XZ$, $m(\angle XZY) = 30^\circ$, $m(\angle ELY) = 120^\circ$, where $E \in \overleftrightarrow{ZL}$.

Prove that: YXZL is a cyclic quadrilateral.

Answer

In $\triangle XYZ$: $\therefore XY = XZ$ $\therefore m(\angle XYZ) = m(\angle XZY) = 30^\circ$

$\therefore m(\angle X) = 180^\circ - (30^\circ + 30^\circ) = 120^\circ$



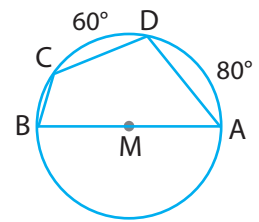
$$\therefore m(\angle X) = m(\angle YLE) = 120^\circ$$

$\therefore$ YXZL is a cyclic quadrilateral.

6 In the opposite figure:

$m(\widehat{AD}) = 80^\circ$, $m(\widehat{DC}) = 60^\circ$, $\overline{AB}$ is a diameter of the circle M.

Find the measure of the interior angles of the figure ABCD.



Answer

$\therefore \overline{AB}$ is a diameter of the circle M. $\therefore m(\widehat{AB}) = 180^\circ$

$$\therefore m(\widehat{BC}) = 180^\circ - (60^\circ + 80^\circ) = 40^\circ$$

$$\therefore m(\angle A) = \frac{1}{2} m(\widehat{BD}) = 100^\circ \div 2 = 50^\circ \text{ (inscribed angle)}$$

$$\therefore m(\angle B) = \frac{1}{2} m(\widehat{AC}) = 140^\circ \div 2 = 70^\circ \text{ (inscribed angle)}$$

$\therefore$ ABCD is a cyclic quadrilateral.

$$\therefore m(\angle C) = 180^\circ - m(\angle A) = 180^\circ - 50^\circ = 130^\circ$$

$$, m(\angle D) = 180^\circ - m(\angle B) = 180^\circ - 70^\circ = 110^\circ$$

7 Two circles M and N with radii lengths 9 cm and 4 cm respectively. Show the position of each of them with respect to the other in each of the following cases:

a. $MN = 12 \text{ cm}$

b. $MN = 5 \text{ cm}$

c. $MN = 4 \text{ cm}$

Answer

$$r_1 = 9 \text{ cm}, r_2 = 4 \text{ cm}, r_1 + r_2 = 13 \text{ cm}, r_1 - r_2 = 5 \text{ cm}$$

a. $\therefore MN = 12 \text{ cm} \quad \therefore r_1 - r_2 < MN < r_1 + r_2$

$\therefore$ The two circles are intersecting.

b. $\therefore MN = 5 \text{ cm} \quad \therefore r_1 - r_2 = MN$

$\therefore$ The two circles are touching internally.

c. $\therefore MN = 4 \text{ cm} \quad \therefore r_1 - r_2 > MN$

$\therefore$ One of the two circles is inside the other.

A Choose the correct answer:

- 1 The point of concurrence of the medians of the triangle divides each median by the ratio from base.
(1 : 2 , 1 : 3 , 2 : 1 , 3 : 1)
- 2 The number of symmetry axes of any circle is
(0 , 2 , 3 , an infinite number)
- 3 In $\triangle ABC$, if $(AC)^2 = (AB)^2 + (BC)^2$, $m(\angle C) = 50^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$.
(50 , 90 , 40 , 45)
- 4 If the lengths of two adjacent sides of a parallelogram are 4 cm, 6 cm, then the perimeter of this parallelogram is cm.
(24 , 12 , 20 , 8)
- 5 The length of the diagonal of a square is 5 cm, then its surface area = cm^2 .
(25 , 5 , 12.5 , 20)
- 6 If the quadrilateral XYZL is a cyclic quadrilateral: then $m(\angle Y) + m(\angle L) = \dots\dots\dots$
(90° , 120° , 360° , 180°)
- 7 If $m(\angle A) = 120^\circ$, then $m(\text{reflex } \angle A) = \dots\dots\dots$
(220° , 360° , 240° , 180°)
- 8 The two similar triangles are congruent, then the enlargement ratio equals
(0 , 1 , 2 , otherwise)
- 9 The parallelogram in which the two diagonals are perpendicular is called
(a square , a rectangle , a trapezium , a rhombus)

B Answer each of the following:

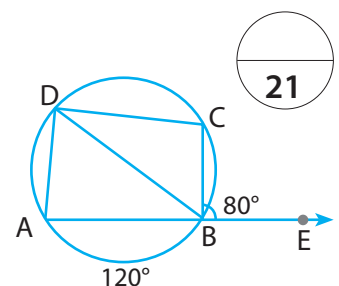
- 1 $E \in \overrightarrow{AB}$, $E \notin (\overline{AB})$, $m(\widehat{AB}) = 120^\circ$, $m(\angle CBE) = 80^\circ$,

Find with proof: $m(\angle BDC)$.

Answer

$$\therefore m(\angle ADB) = \frac{1}{2} m(\widehat{AB})$$

$$\therefore m(\angle ADB) = 120^\circ \div 2 = 60^\circ$$



$\therefore ABCD$ is a cyclic quadrilateral.

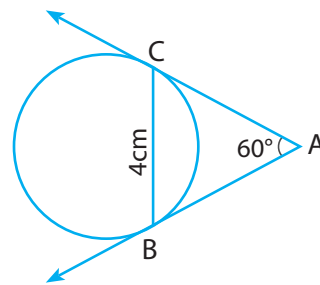
$\therefore m(\angle ADC) = m(\angle CBE) = 80^\circ$

$\therefore m(\angle BDC) = 80^\circ - 60^\circ = 20^\circ$

2 Complete:

In the opposite figure:

$\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents, then the perimeter of ΔABC is **12**..... cm.



3 LMNO is a parallelogram, $OP = OL$

Prove that: MNOP is a cyclic quadrilateral.

Answer

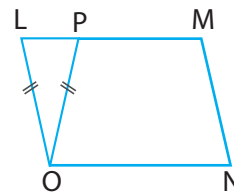
In ΔLOP , $\therefore OP = OL$

$\therefore m(\angle L) = m(\angle LPO)$

$\therefore LMNO$ is a parallelogram.

$\therefore m(\angle L) = m(\angle N)$, $\therefore m(\angle N) = m(\angle LPO)$

$\therefore MNOP$ is a cyclic quadrilateral.



4 If M is a circle with radius length 18 cm., $\overleftrightarrow{MN} \perp$ straight line S, where $N \in$ straight line S, determine the position of the straight line S with respect to the circle M in each of the following cases:

1. $MN = 13$ cm

2. $MN = 18$ cm

3. $MN = 20$ cm

Answer

$\therefore MN = 13 \text{ cm} < r$

$\therefore$ straight line S is a secant to the circle M.

$\therefore MN = 18 \text{ cm} = r$

$\therefore$ straight line S is a tangent to the circle M.

$\therefore MN = 20 \text{ cm} > r$

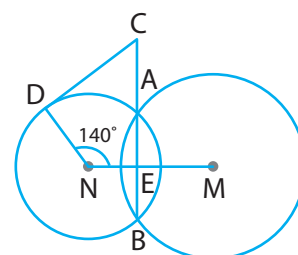
$\therefore$ S is outside to the circle M.

5 In the opposite figure:

M, N are two intersecting circles at A, B,

$\overline{CD}$ is a tangent segment to the circle N, $C \in \overline{BA}$

, $m(\angle MND) = 140^\circ$, find $m(\angle DCE)$.



Answer

$\therefore \overleftrightarrow{MN}$ is the line of centers of the two circles, $\overline{AB}$ is the common chord

$\therefore \overleftrightarrow{MN} \perp \overline{AB}$, $\therefore m(\angle AEN) = 90^\circ$

$\therefore \overline{CD}$ is a tangent segment to the circle N at D.

$\therefore \overline{ND} \perp \overline{CD}$, $\therefore m(\angle CDN) = 90^\circ$

From the quadrilateral CDNE

$\therefore m(\angle DCE) = 360^\circ - (140^\circ + 90^\circ + 90^\circ) = 40^\circ$

6 In the opposite figure:

$\overline{AB}$ and $\overline{AC}$ are two tangent segments to the circle at B, C, and $m(\angle A) = 50^\circ$, find with proof $m(\angle D)$.

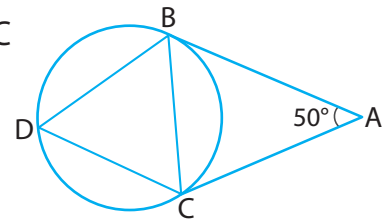
Answer

$\therefore \overline{AB}$ and $\overline{AC}$ are two tangent segments to the circle.

$\therefore AB = AC$

$\therefore$ In $\triangle ABC$, $m(\angle ABC) = m(\angle ACB) = (180^\circ - 50^\circ) \div 2 = 65^\circ$

$\therefore m(\angle D)$ (inscribed) = $m(\angle ACB)$ (tangency) = 65°



7 In the opposite figure:

$m(\angle A) = 40^\circ$, $m(\widehat{EC}) = 100^\circ$,

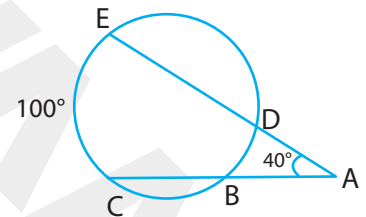
find with proof: $m(\widehat{BD})$

Answer

$\therefore m(\angle A) = \frac{1}{2} [m(\widehat{EC}) - m(\widehat{BD})]$

$\therefore 40^\circ = \frac{1}{2} [100^\circ - m(\widehat{BD})]$

$\therefore m(\widehat{BD}) = 100^\circ - 80^\circ = 20^\circ$



حمل الآن

مجاناً وحصرياً

امتحانات رقم (4)

الترم الثاني



Model Examinations of the School Book on Algebra and Probability



Model

1

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The domain of the function $n : n(x) = \frac{x}{x-1}$ is

- (a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{0, 1\}$ (d) $\mathbb{R} - \{-1\}$

2 The number of solutions of the two equations : $x + y = 2$ and $y + x = 3$ together in $\mathbb{R} \times \mathbb{R}$ is

- (a) zero (b) 1 (c) 2 (d) 3

3 If $x \neq 0$, then $\frac{5x}{x^2+1} \div \frac{x}{x^2+1} = \dots\dots\dots$

- (a) -5 (b) -1 (c) 1 (d) 5

4 If the ratio between the perimeters of two squares is 1 : 2, then the ratio between their areas is

- (a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1

5 The equation of the symmetry axis of the curve of the function f where $f(x) = x^2 - 4$ is

- (a) $x = -4$ (b) $x = 0$ (c) $y = 0$ (d) $y = -4$

6 If $A \subset S$ of a random experiment and $P(\bar{A}) = 2P(A)$, then $P(A) = \dots\dots\dots$

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1

2 [a] By using the general formula, find in $\mathbb{R}$ the solution set of the equation : $2x^2 - 5x + 1 = 0$ "approximating the result to the nearest one decimal".

[b] Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x-3}{x^2-7x+12} - \frac{4}{x^2-4x}$$

3 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$$x - y = 0 \text{ and } x^2 + xy + y^2 = 27$$

[b] Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x^2+4x+3}{x^3-27} \div \frac{x+3}{x^2+3x+9}, \text{ then find : } n(2), n(-3) \text{ if possible.}$$

- 4 [a] A rectangle with a length more than its width by 4 cm. If the perimeter of the rectangle is 28 cm., find the area of the rectangle.

[b] If $n(x) = \frac{x^2 - 2x}{x^2 - 3x + 2}$,

1 Find $n^{-1}(x)$ in the simplest form, showing the domain of n^{-1}

2 If $n^{-1}(x) = 3$, then find the value of x

5 [a] If $n_1(x) = \frac{x^2}{x^3 - x^2}$ and $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, then prove that : $n_1 = n_2$

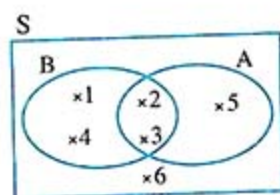
[b] In the opposite figure :

If A and B are two events from the sample space S of a random experiment, then find :

1 $P(A \cap B)$

2 $P(A - B)$

3 The probability of non-occurrence of the event A



Model

2

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

1 The solution set of the two equations : $x = 3$, $y = 4$ in $\mathbb{R} \times \mathbb{R}$ is

(a) $\{(3, 4)\}$

(b) $\{(4, 3)\}$

(c) $\mathbb{R}$

(d) $\emptyset$

2 The set of zeroes of the function f where $f(x) = x^2 + 4$ in $\mathbb{R}$ is

(a) $\{2\}$

(b) $\{2, -2\}$

(c) $\mathbb{R}$

(d) $\emptyset$

3 If A and B are two mutually exclusive events of a random experiment, then $P(A \cap B) = \dots$

(a) 0

(b) 1

(c) 0.5

(d) $\emptyset$

4 The domain of the multiplicative inverse of the function $f : f(x) = \frac{x+2}{x-3}$ is

(a) $\mathbb{R} - \{3\}$

(b) $\mathbb{R} - \{-2, 3\}$

(c) $\mathbb{R} - \{-3\}$

(d) $\mathbb{R}$

5 The two straight lines : $3x + 5y = 0$, $5x - 3y = 0$ intersect in the

(a) first quadrant.

(b) second quadrant.

(c) origin point.

(d) fourth quadrant.

6 If $P(A) = 0.6$, then $P(\bar{A}) = \dots$

(a) 0.4

(b) 0.6

(c) 0.5

(d) 1

- 2 [a] Find in $\mathbb{R}$ the solution set of the equation : $3x^2 - 5x + 1 = 0$

by using the formula "approximating the result to the nearest two decimal places".

[b] Simplify :

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \times \frac{x + 3}{x^2 + 2x + 4}, \text{ showing the domain of } n.$$

- 3 [a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 1$, $x^2 + y^2 = 25$

[b] If A and B are two events of a random experiment and

$$P(A) = 0.3 \quad , \quad P(B) = 0.6 \quad , \quad P(A \cap B) = 0.2$$

, find : 1 $P(A \cup B)$

2 $P(A - B)$

- 4 [a] Solve the following two equations in $\mathbb{R} \times \mathbb{R}$: $2x - y = 3$, $x + 2y = 4$

[b] Simplify :

$$n(x) = \frac{x^2 + 3x}{x^2 - 9} \div \frac{2x}{x + 3}, \text{ showing the domain of } n.$$

- 5 [a] Simplify :

$$n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x + 3}{x^2 - 5x + 6}, \text{ showing the domain of } n.$$

[b] Graph the function f where $f(x) = x^2 - 1$, $x \in [-3, 3]$, from the graph find in $\mathbb{R}$ the solution set of the equation : $x^2 - 1 = 0$

Governorates' Examinations on Algebra and Probability



1

Cairo Governorate



Answer the following questions :

First Group :

► Choose the correct answer from those given :

- 1 If $a \in \mathbb{R} - \{\text{zero}\}$, n is a positive integer, then $a^n \times a^{-n} = \dots\dots\dots$
 (a) $-a$ (b) zero (c) 1 (d) a
- 2 If the two straight lines that represent two equations of the first degree are coincident, then there is $\dots\dots\dots$ for the two equations.
 (a) no solution (b) unique solution
 (c) two solutions (d) infinite number of solutions
- 3 If A, B are two events from a sample space of a random experiment, then the event of occurrence of A and B together is $\dots\dots\dots$
 (a) $A \cap B$ (b) $A \cup B$ (c) $A - B$ (d) $B - A$
- 4 If the number $k \in]2, 7[$, then k may be equal to $\dots\dots\dots$
 (a) 2 (b) 3 (c) 7 (d) 9
- 5 The simplest form of the function $f : f(x) = \frac{3-x}{x-3}$ is $\dots\dots\dots$ where $x \neq 3$
 (a) -3 (b) -1 (c) 1 (d) 4
- 6 The set of zeroes of the function $f : f(x) = \frac{x-4}{x+1}$ is $\dots\dots\dots$
 (a) $\{4, -1\}$ (b) $\{-1\}$ (c) $\{4\}$ (d) $\mathbb{R}$
- 7 If the ordered pair $(2, 3)$ satisfies the equation : $kx - y = 7$, then $k = \dots\dots\dots$
 (a) 1 (b) 2 (c) 3 (d) 5
- 8 The domain of the function $f : f(x) = 9$ is $\dots\dots\dots$
 (a) $\mathbb{R}$ (b) $\mathbb{R} - \{9\}$ (c) $\{9\}$ (d) $\mathbb{R} - \{-9\}$
- 9 If $n^{-1}(x) = x$ where $x \neq \text{zero}$, then $n(2) = \dots\dots\dots$
 (a) -2 (b) $-\frac{1}{2}$ (c) $\frac{1}{2}$ (d) 2

Second Group :

► Answer the following questions showing the steps of solution :

10 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$$2x - y = 3, \quad x + y = 9$$

11 If x and y are two positive numbers the difference between them is 2 and their product is 24, find the two numbers.

12 If $n_1(x) = \frac{x^2 - 9}{x + 3}$, $n_2(x) = \frac{2x - 6}{2}$, prove that : $n_1(x) = n_2(x)$ for all values of x which belong to the common domain and state this domain.

13 Find $n(x)$ in the simplest form showing its domain where :

$$n(x) = \frac{1}{x+2} + \frac{x+2}{x^2 + 4x + 4}$$

14 By using the general formula find in $\mathbb{R}$ the solution set of the equation :

$$3x^2 - 5x + 1 = 0 \text{ (to the nearest one decimal place).}$$

15 Find $n(x)$ in the simplest form showing its domain where :

$$n(x) = \frac{x^2 + x - 6}{x^3 - 8} \times \frac{x^2 + 2x + 4}{x + 3}$$

16 If A, B are two events from a sample space of a random experiment and

$$P(A) = \frac{1}{2}, \quad P(B) = \frac{2}{3}, \quad P(A \cap B) = \frac{1}{3}, \text{ find :}$$

(1) $P(A \cap B)$

(2) $P(A \cup B)$

2

Giza Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

1 If $A < B < \text{zero} < C$, then $AB \dots\dots\dots BC$

(a) $<$

(b) $=$

(c) $\geq$

(d) $>$

2 $\sqrt{100 - 36} = 10 - \dots\dots\dots$

(a) 2

(b) 6

(c) 4

(d) 3

3 If A and B are two events in the sample space of a random experiment and $B \subset A$, then $P(A \cap B) = \dots\dots\dots$

(a) 1

(b) $P(A)$

(c) $P(B)$

(d) zero

- 4 The domain of the additive inverse of the function $n : n(x) = \frac{x+3}{x-4}$ is
 (a) $\mathbb{R} - \{-3\}$ (b) $\mathbb{R} - \{4\}$ (c) $\mathbb{R} - \{-2, 2\}$ (d) $\{-3, 4\}$
- 5 If the set of zeroes of the function $f : f(x) = x + k$ is $\{5\}$, then $k =$
 (a) -5 (b) 5 (c) ± 5 (d) zero
- 6 The sum of two numbers is 8 and their product is 15, then the two numbers are
 (a) 2, 6 (b) 3, 5 (c) 7, 1 (d) 4, 4
- 7 The curve of the function $f : f(x) = ax^2 + bx + c$ cuts the y-axis at the point
 (a) (0, b) (b) (0, c) (c) (b, 0) (d) (c, 0)
- 8 The domain of the function $f : f(x) = \frac{x-1}{x^2-9}$ is
 (a) $\mathbb{R}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{9\}$ (d) $\mathbb{R} - \{3, -3\}$
- 9 The set of zeroes of the function $f : f(x) = \frac{x-2}{5}$ is
 (a) $\{5\}$ (b) $\{\frac{2}{5}\}$ (c) $\{2\}$ (d) $\{\frac{-2}{5}\}$

Second Group :

► Answer the following questions :

- 10 Find $n(x)$ in the simplest form showing the domain of n where :

$$n(x) = \frac{x+2}{x^2+3x+2} - \frac{x^2-x}{1-x^2}$$

- 11 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$$x - y = 0 \text{ and } xy = 16$$

- 12 By using the general formula, find in $\mathbb{R}$ the solution set of the equation :

$$x^2 - 6x + 4 = 0 \text{ (approximating the result to the nearest one decimal place)}$$

- 13 If A and B are two events from a sample space of a random experiment and $P(A) = 0.7$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, then find :

(1) $P(A \cup B)$

(2) $P(B - A)$

- 14 If $n_1(x) = \frac{5x}{5x+25}$, $n_2(x) = \frac{x^2+5x}{x^2+10x+25}$, then prove that $n_1 = n_2$

- 15 Find $n(x)$ in simplest form showing the domain of n where :

$$n(x) = \frac{x^3-8}{x^2+x-6} \times \frac{2x+6}{x^2+2x+4}$$

- 16 Find algebraically the solution set in $\mathbb{R} \times \mathbb{R}$ of the two equations :

$$3x + 2y = 4 \text{ and } x - 3y = 5 \text{ (show the steps)}$$



Answer the following questions : (Calculator is allowed)

- 1 The set of zeroes of the function $f : f(x) = \frac{x-2}{x^2-4}$ is
 (a) $\{2\}$ (b) $\{-2\}$ (c) $\{-2, 2\}$ (d) $\emptyset$
- 2 The solution set of the two equations $x=3$, $x^2+y^2=25$ in $\mathbb{R} \times \mathbb{R}$ is
 (a) $\{(3, 4)\}$ (b) $\{(3, 4), (3, -4)\}$ (c) $\{(3, -4)\}$ (d) $\{(4, -3)\}$
- 3 The number of solutions of the two equations $x+y=3$, $x+y=-3$ is
 (a) zero (b) 1 (c) 2 (d) 3
- 4 By using the general formula find the solution set of the equation :
 $x^2 - 5x + 2 = 0$ in $\mathbb{R}$ taking $\sqrt{17} \approx 4.12$
- 5 The solution set of the two equations : $x-3=0$, $y+2=0$ in $\mathbb{R} \times \mathbb{R}$ is
 (a) $\{3, 2\}$ (b) $\{-3, -2\}$ (c) $\{(3, -2)\}$ (d) $\{(-2, 3)\}$
- 6 The domain of the function $f : f(x) = \frac{x+2}{x-1}$ is
 (a) $\{1, -2\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{1, -2\}$ (d) $\{2, -1\}$
- 7 If $P(A) = 0.6$, then $P(\bar{A}) =$
 (a) 0.4 (b) 0.6 (c) 0.5 (d) 1
- 8 Find algebraically the solution set of the two equations :
 $x+y=7$, $x-y=3$ in $\mathbb{R} \times \mathbb{R}$
- 9 If $n_1(x) = \frac{x^2}{x^2-x}$, $n_2(x) = \frac{x^3-x^2}{x^3-2x^2+x}$, prove that : $n_1 = n_2$
- 10 Find $n(x)$ in the simplest form, showing the domain : $n(x) = \frac{x-5}{x^2-2x-15} \div \frac{8}{2x+6}$
- 11 If $n(x) = \frac{3x-9}{x^2-5x+6}$, find $n^{-1}(x)$ in the simplest form showing the domain
 , then find $n^{-1}(3)$ if possible.
- 12 If A and B are two events from a sample space of a random experiment and $P(A) = 0.4$, $P(B) = 0.5$, $P(A \cap B) = 0.2$, find :
 (1) $P(A \cup B)$ (2) The probability of the non-occurrence of the event A
- 13 If A, B are two events of a random experiment, $A \subset B$, then $P(A \cup B) =$
 (a) $P(A)$ (b) $P(B)$ (c) 1 (d) zero

14 The additive inverse of the function : $n(x) = \frac{x-3}{x+2}$ is

- (a) $\frac{x+3}{x-2}$ (b) $\frac{3-x}{x+2}$ (c) $\frac{-x-3}{x+2}$ (d) $\frac{-x-3}{-x-2}$

15 $[3, 5] - \{3, 5\} = \dots\dots\dots$

- (a) $]3, 5[$ (b) $[3, 5]$ (c) $[3, 5[$ (d) $]3, 5]$

16 Find $n(x)$ in the simplest form showing its domain :

$$n(x) = \frac{x^2 + 4x}{x^2 - 16} + \frac{x-3}{x^2 - 7x + 12}$$

4

El-Kalyoubia Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

1 If $\sqrt{y} = 2$, then the value of $3y = \dots\dots\dots$

- (a) 12 (b) 6 (c) 4 (d) 2

2 If $LM = 5$, $LM^2 = 20$, then $M = \dots\dots\dots$

- (a) 100 (b) 25 (c) 4 (d) $\frac{1}{2}$

3 If the two equations : $2x - 3y = 2$, $6x - 9y = k$ have an infinite number of solutions, then the $k = \dots\dots\dots$

- (a) 4 (b) 6 (c) 8 (d) 12

4 The set of zeroes of the function $f : f(x) = x^2 - 4$ is

- (a) $\{2\}$ (b) $\{-2\}$ (c) $\{-2, 2\}$ (d) $\{-2, 0\}$

5 If $y = 3$, $x^2 = y + 6$, then $x = \dots\dots\dots$

- (a) 10 (b) 3 (c) -3 (d) ± 3

6 The domain of the function $f : f(x) = \frac{x-4}{5}$ is

- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{4\}$ (c) $\{5\}$ (d) $\mathbb{R} - \{5\}$

7 The simplest form of the function $f : f(x) = \frac{x}{2x+2} + \frac{1}{2x+2}$ is

- (a) $\frac{1}{2}$ (b) 1 (c) $\frac{x+1}{x+2}$ (d) $\frac{2x}{x+1}$

8 If $n(x) = \frac{3}{2x} + \frac{1}{2x}$, then $n^{-1}(x) = \dots\dots\dots$ where $x \neq 0$

- (a) $-\frac{4}{x}$ (b) $\frac{4}{x}$ (c) $\frac{x}{4}$ (d) $\frac{x}{2}$

Second Question :

[a] Choose the correct answer from the given ones :

- 1 The domain of the multiplicative inverse of the function $f : f(x) = \frac{x-1}{x^2+4}$ is
(a) $\mathbb{R} - \{1, 2, -2\}$ (b) $\mathbb{R} - \{2, -2\}$
(c) $\mathbb{R}$ (d) $\mathbb{R} - \{1\}$
- 2 If $2^x = 3$, then $8^{-x} =$
(a) -27 (b) 81 (c) $\frac{1}{27}$ (d) $\frac{1}{81}$
- 3 The common domain of two functions n_1 and $n_2 : n_1(x) = \frac{x}{x-3}, n_2(x) = \frac{x+3}{2}$ is
(a) $\mathbb{R} - \{2, 3\}$ (b) $\mathbb{R} - \{0, 3\}$ (c) $\mathbb{R} - \{3\}$ (d) $\mathbb{R} - \{2\}$

[b] Find the solution set of the following equation in $\mathbb{R}$:

$$2x^2 - 4x + 1 = 0 \text{ (Approximating the result to nearest two decimal places)}$$

Third Question :

[a] If $n(x) = \frac{x^2 - 3x + 2}{x^2 - 4} - \frac{3x - x^2}{x^2 - x - 6}$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 3$, $2x + y = 6$

Fourth Question :

[a] Choose the correct answer from the given ones :

- 1 $\sqrt{25 - 9} = 5 -$
(a) 3 (b) 4 (c) 1 (d) -1
- 2 If $Z(f) = \emptyset$, then $f(x)$ may be
(a) $x^2 + 4$ (b) $x - 4$ (c) $x^2 - 4$ (d) $x + 4$
- 3 If the two straight lines : $x - 3y = 2$, $x + ky = 5$ are parallel , then $k =$
(a) 2 (b) -3 (c) 5 (d) 3

[b] If $n_1(x) = \frac{5x}{5x+10}$, $n_2(x) = \frac{x^2+2x}{x^2+4x+4}$, prove that : $n_1 = n_2$

Fifth Question :

[a] Choose the correct answer from the given ones :

- 1 The simplest form of $f : f(x) = \frac{x}{2-x} + \frac{2}{x-2}$ is
(a) $x - 2$ (b) x (c) 2 (d) -1
- 2 If $\frac{x}{y} = 3$, $y^2 = 4$, then $x =$
(a) ± 6 (b) -6 (c) 6 (d) 3

3 If $A \subset B$, then $P(A - B) = \dots\dots\dots$

- (a) $P(B)$ (b) zero (c) $P(A)$ (d) 1

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 1$, $y^2 + x = 7$

6

El-Monofia Governorate



Answer the following questions : (Calculator is allowed)

First Question :

[a] Choose the correct answer :

1 Set of zeroes of the function $f : f(x) = 9$ is $\dots\dots\dots$

- (a) $\{9\}$ (b) $\{0\}$ (c) $\emptyset$ (d) $\mathbb{R} - \{9\}$

2 If $5^y = 1$, then $y = \dots\dots\dots$

- (a) 1 (b) 5 (c) $\frac{1}{5}$ (d) zero

3 The two events A, B are mutually exclusive events if $A \cap B = \dots\dots\dots$

- (a) zero (b) -1 (c) $\{0\}$ (d) $\emptyset$

[b] Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$$x - y = 7 \text{ , } xy = 18$$

Second Question :

[a] Choose the correct answer :

1 If $a^2 - b^2 = 15$, $a - b = 3$, then $a + b = \dots\dots\dots$

- (a) 5 (b) 1 (c) 3 (d) 12

2 If the two straight lines : $x + 2y = 4$, $2x + ky = 11$ are parallel, then $k = \dots\dots\dots$

- (a) 3 (b) 4 (c) 5 (d) 6

3 If $n(x) = \frac{x-1}{x+3}$, then the domain of n^{-1} is $\dots\dots\dots$

- (a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{1\}$ (c) $\mathbb{R} - \{-3, 1\}$ (d) $\{-3, 1\}$

[b] Find $n(x)$ in the simplest form :

$$n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} + \frac{x^2 + x - 2}{x^2 - 4} \text{ , then find the domain of } n$$

Third Question :

[a] Choose the correct answer :

1 If $A \subset S$, $P(A) = P(\bar{A})$, then $P(A) = \dots\dots\dots$

- (a) 0.2 (b) 0.5 (c) 0.3 (d) 0.6

2 If the curve of quadratic function f passing through the points $(-1, 0)$, $(0, -4)$, $(4, 0)$, then the solution set of the function $f(x) = \text{zero}$ in $\mathbb{R}$ is

- (a) $\{-1, 0\}$ (b) $\{-4, 0\}$ (c) $\{-1, 4\}$ (d) $\{4, -4\}$

3 The domain of the function $f : f(x) = \frac{x-7}{3(x+1)}$ is

- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{-1\}$ (c) $\mathbb{R} - \{1\}$ (d) $\mathbb{R} - \{-1, 3\}$

[b] If $n_1(x) = \frac{2x}{2x+8}$, $n_2(x) = \frac{x^2+4x}{x^2+8x+16}$, prove that : $n_1 = n_2$

Fourth Question :

[a] If A, B are two events from a sample space of a random experiment and $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{4}$, $P(A \cap B) = \frac{1}{8}$, find each of the following :

- (1) $P(A \cup B)$ (2) $P(A - B)$ (3) $P(B^c)$

[b] Find in the simplest form of : $n(x) = \frac{2x^2+4x}{x^2-4} \times \frac{x-2}{2x+6}$ showing the domain of n

Fifth Question :

[a] Find the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$ algebraically :

$$2x - y = 3, \quad x + 2y = 4$$

[b] Find the solution set of the equation in $\mathbb{R}$ by using general rule : $x^2 - 2x - 4 = 0$ (approximating the result to nearest two decimal places)



El-Gharbia Governorate



Answer the following questions :

First Group :

► Choose the correct answer from those given :

1 If the two straight lines : $x + 2y = 1$ and $2x + ay = 5$ are parallel, then $a = \dots\dots\dots$

- (a) 2 (b) 4 (c) 6 (d) zero

2 If the curve of the second degree equation f does not intersect x -axis, then the number of solutions of the equation $f(x) = \text{zero}$ in $\mathbb{R}$ is

- (a) zero (b) 1 (c) 2 (d) infinite.

3 $\sqrt{16+9} = 4 + \dots\dots\dots$

- (a) 3 (b) 2 (c) 1 (d) 5

- 4 If $n(x) = \frac{7}{x} + \frac{x}{7}$, then the domain of n is
 (a) $\mathbb{R}$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R} - \{7\}$ (d) $\mathbb{R} - \{0, 7\}$
- 5 If $x + y = 2$, then $2x + 2y + 1 = \dots\dots\dots$
 (a) 1 (b) 2 (c) 4 (d) 5
- 6 The common domain of the two fractions $\frac{3}{x-6}$ and $\frac{9}{2x-12}$ is
 (a) $\emptyset$ (b) $\mathbb{R} - \{6\}$ (c) $\mathbb{R} - \{12\}$ (d) $\mathbb{R} - \{6, 12\}$
- 7 If A and B are two mutually exclusive events from a random experiment, $P(A) = \frac{1}{3}$, $P(A \cup B) = \frac{7}{12}$, then $P(B) = \dots\dots\dots$
 (a) $\frac{1}{4}$ (b) $\frac{1}{12}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$
- 8 The set of zeroes of the function $n : n(x) = \frac{x}{x-5} + \frac{4}{5-x}$ is
 (a) $\{5\}$ (b) $\{-5\}$ (c) $\{4\}$ (d) $\{-4\}$
- 9 If the multiplicative inverses of the algebraic fraction $\frac{x+2}{x+1}$ is $\frac{x+1}{x-a}$, then $a = \dots\dots\dots$
 (a) -2 (b) 2 (c) 1 (d) -1

Second Group :

► Answer the following questions (Showing the steps) :

- 10 If $n_1(x) = \frac{x}{x^2-x}$, $n_2(x) = \frac{x^2+x+1}{x^3-1}$, then show whether $n_1 = n_2$ or not (give reason).
- 11 Find $n(x)$ in the simplest form, showing the domain of n , then find $n(-2)$ if possible, where : $n(x) = \frac{x^2+2x}{x^3-27} \div \frac{x+2}{x^2+3x+9}$
- 12 By using the general formula, find in $\mathbb{R}$ the solution set of the equation : $2x^2 - 4x + 1 = 0$ (rounding the results to the nearest two decimal places).
- 13 Find $n(x)$ in the simplest form, showing the domain : $n(x) = \frac{x^2-3x}{x^2-5x+6} - \frac{2x+4}{x^2-4}$
- 14 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x + y = 3$ and $xy = 2$
- 15 If A and B are two events in the sample space of a random experiment and $P(A) = 0.3$, $P(A \cap B) = 0.3$, then find $P(A)$ and $P(A - B)$
- 16 Find the values of a and b , where $(3, -1)$ is a solution for the two equations : $ax + by - 5 = 0$ and $3ax + by = 17$



Answer the following questions : (Calculator is permitted)

First Question :

[a] Choose the correct answer :

- 1 If A , B are two mutually exclusive events from the sample space S of a random experiment , then $(A \cap B) = \dots\dots\dots$
 (a) zero (b) S (c) 1 (d) $\emptyset$
 - 2 If $X + 3y = 7$, then $X + 3(y + 5) = \dots\dots\dots$
 (a) 22 (b) 21 (c) 7 (d) 3
 - 3 The common domain of the two fractions $n_1(x) = \frac{3}{x^2 - 1}$, $n_2(x) = \frac{4x}{x^2 - x}$ is $\dots\dots\dots$
 (a) $\mathbb{R} - \{1\}$ (b) $\mathbb{R} - \{0, 1\}$ (c) $\mathbb{R} - \{0, 1, -1\}$ (d) $\mathbb{R} - \{-1, 1\}$
- [b] By using the general formula find in $\mathbb{R}$ the solution set of the equation :
 $x^2 - 6x + 4 = 0$, approximating the result to the nearest three decimal digits.

Second Question :

[a] Choose the correct answer :

- 1 If the two equations : $3x + my = 5$, $kx + 6y = 15$ have an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then $km = \dots\dots\dots$
 (a) 18 (b) 12 (c) 6 (d) 3
 - 2 The set of zeroes of the function $f : f(x) = x^2 + 25$ is $\dots\dots\dots$
 (a) $\{5\}$ (b) $\{-5\}$ (c) $\{-5, 5\}$ (d) $\emptyset$
 - 3 If $(x - 4, 5) = (3, y + 2)$, then $x + y = \dots\dots\dots$
 (a) 12 (b) 10 (c) 8 (d) 6
- [b] If n_1, n_2 are two algebraic fractions , $n_1(x) = \frac{2x}{2x+4}$, $n_2(x) = \frac{x^2+2x}{x^2+4x+4}$
 , prove that : $n_1 = n_2$

Third Question :

[a] Choose the correct answer :

- 1 The equation $xy = 3$ of $\dots\dots\dots$ degree in two variables.
 (a) zero (b) first (c) second (d) third

- 2 If the domain of the function $f : f(x) = \frac{3}{x+k}$ is $\mathbb{R} - \{-2\}$, then $k = \dots\dots\dots$
- (a) 2 (b) 3 (c) -3 (d) -2
- 3 The simplest form of the function $n : n(x) = \frac{3-x}{x-3}$, where $x \neq 3$ is $\dots\dots\dots$
- (a) 3 (b) -3 (c) 1 (d) -1

[b] Find the value of a, b if $(1, 2)$ is a solution for the equations :

$$a x + b y = -5 \quad , \quad 2 a x + b y = 2$$

Fourth Question :

[a] Find $n(x)$ in the simplest form, showing the domain :

$$n(x) = \frac{x^2 - 2x + 4}{x^3 + 8} + \frac{x^2 - 1}{x^2 + x - 2}$$

[b] If A and B are two events of the sample space of a random experiment, and $P(A) = 0.5$, $P(B) = 0.4$, $P(A \cap B) = 0.1$, find :

- (1) $P(A \cup B)$ (2) $P(B - A)$

Fifth Question :

[a] If $n(x) = \frac{x^2 - 2x}{(x-2)(x^2 + 2)}$

- (1) Find $n^{-1}(x)$ and find the domain of n^{-1} (2) If $n^{-1}(x) = 3$, find value of x

[b] The length of a rectangle is 3 cm more than its width and its area is 28 cm^2 , find its perimeter.



Ismailia Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from the given answers :

- 1 If A, B are two mutually exclusive events in a random experiment, then $P(A \cap B) = \dots\dots\dots$
- (a) $\emptyset$ (b) zero (c) 1 (d) 0.5
- 2 If $(x^2 + 10x + k)$ is a perfect square, then $k = \dots\dots\dots$
- (a) 25 (b) 16 (c) 9 (d) 1

- 3 If $n(x) = \frac{x^2 - 9}{x}$, then the domain of n^{-1} is
- (a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R} - \{0, 3\}$ (c) $\mathbb{R} - \{0, -3, 3\}$ (d) $\mathbb{R}$
- 4 The point of intersection of the two straight lines : $x + 3 = 0$, $y = 5$ is
- (a) (3, 5) (b) (-3, 5) (c) (-3, -5) (d) (3, -5)
- 5 If x is a negative number, then the greatest number from the following numbers is
- (a) $5 + x$ (b) $5x$ (c) $\frac{5}{x}$ (d) $5 - x$
- 6 If the two equations : $x + 4y = 7$, $3x + ky = 21$ have infinite number of solutions, then $k =$
- (a) 4 (b) 7 (c) 12 (d) 21
- 7 If $n(x) = \frac{x+k}{x^2+1}$, $n(2) = 1$, then $k =$
- (a) -1 (b) zero (c) 3 (d) 4
- 8 The set of zeroes of the function f where : $f(x) = x^2 + 4$ in $\mathbb{R}$ is
- (a) $\{2\}$ (b) $\{-2, 2\}$ (c) $\mathbb{R}$ (d) $\emptyset$
- 9 The simplest form of $f(x)$ where $f(x) = \frac{10-2x}{x-5}$, $x \neq 5$ is
- (a) -1 (b) -2 (c) 1 (d) 2

Second Group :

► Answer the following questions :

- 10 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations together :
- $$2x + y = 9 \quad , \quad 3x - y = 6$$
- 11 Find $n(x)$ in the simplest form showing the domain of n where :
- $$n(x) = \frac{x^2 + 2x}{x^2 - 4} + \frac{x - 3}{x^2 - 5x + 6}$$
- 12 If A and B are two events from a sample space of a random experiment, $P(A) = 0.3$, $P(B) = 0.5$, $P(A \cup B) = 0.7$, find :
- (1) $P(A \cap B)$ (2) $P(B - A)$
- 13 Find the solution set of the following two equations together in $\mathbb{R} \times \mathbb{R}$:
- $$x - y = 1 \quad , \quad x^2 + y^2 = 25$$
- 14 If $n_1(x) = \frac{1}{x-1}$, $n_2(x) = \frac{x^2 + x + 1}{x^3 - 1}$, prove that : $n_1 = n_2$
- 15 Using the general formula to find the solution set of the equation :
- $$x^2 + 3x + 1 = 0 \text{ in } \mathbb{R} \text{ (Approximating the result to the nearest 2-decimals)}$$
- 16 Find $n(x)$ in the simplest form showing the domain where : $n(x) = \frac{x^2 - 6x + 9}{x - 3} \times \frac{15}{5x - 15}$



Answer the following questions :

First Group :

► Choose the correct answer from those given :

- 1 The domain of n^{-1} where $n(x) = \frac{x+4}{x-4}$ is
 (a) $\mathbb{R}$ (b) $\mathbb{R} - \{4\}$ (c) $\mathbb{R} - \{-4, 4\}$ (d) $\{4, -4\}$
- 2 If $x \in \mathbb{R} - \{0, 1\}$, then $\frac{1-x}{x} \div \frac{x-1}{x} = \dots\dots\dots$
 (a) 1 (b) -1 (c) $x-1$ (d) x
- 3 If $f(x) = \frac{x+7}{x-3}$, then $f(x)$ is undefined when $x = \dots\dots\dots$
 (a) 3 (b) 7 (c) -3 (d) -7
- 4 Two positive integer numbers their sum is 8 and their difference is 2, then the two numbers are
 (a) 2, 6 (b) 3, 5 (c) 6, 4 (d) 2, 4
- 5 $\mathbb{R}_+ \cap \mathbb{R}_- = \dots\dots\dots$
 (a) $\{0\}$ (b) $\mathbb{R}$ (c) $\emptyset$ (d) $\mathbb{R}_+$
- 6 The set of zeroes of the function $f : f(x) = 0$ is
 (a) $\mathbb{R} - \{0\}$ (b) $\emptyset$ (c) $\{0\}$ (d) $\mathbb{R}$
- 7 If the curve of the quadratic function f is symmetrical around y-axis and passing through the point $(2, 0)$, then the solution set of the equation $f(x) = 0$ in $\mathbb{R}$ is
 (a) $\{2, -2\}$ (b) $\{2\}$ (c) $\{0, 2\}$ (d) $(2, -2)$
- 8 $3 \times 4 - 4 \div 2 = \dots\dots\dots$
 (a) 0 (b) 4 (c) 6 (d) 10
- 9 If $\bar{A}$ is the complementary event of the event A , then $A \cup \bar{A} = \dots\dots\dots$
 (a) $\frac{1}{2}$ (b) 1 (c) S (d) $\emptyset$

Second Group :

► Answer the following questions :

- 10 If $n_1(x) = \frac{x^2-4}{x^2-4x+4}$, $n_2(x) = \frac{x+2}{x-2}$, prove that : $n_1 = n_2$
- 11 If A, B are mutually exclusive events of random experiment and $P(A) = \frac{3}{5}$, $P(B) = \frac{1}{5}$, find $P(A \cap B)$, $P(A \cup B)$

- 12 Put in simplest form showing the domain : $n(x) = \frac{2x}{x+2} + \frac{4}{x+2}$
- 13 Put in simplest form showing the domain : $n(x) = \frac{x^2+3x}{x^2-9} \times \frac{x-3}{2x}$
- 14 Find in $\mathbb{R}$ the solution set of the following equation $x^2 - 5x + 3 = 0$ rounding the results to the nearest one decimal place (using the general rule).
- 15 Find algebraically the solution set of the following two equations in $\mathbb{R} \times \mathbb{R}$:
 $x + y = 5$, $x - y = 1$
- 16 Find the solution set of the following two equations in $\mathbb{R} \times \mathbb{R}$: $x - 2y = 0$, $xy = 8$



Damietta Governorate



Answer the following questions :

First Question :

[a] Choose the correct answer from the given choices :

- 1 If A and B are two events in a sample space , $P(A) = 0.7$ and $P(A \cap B) = 0.5$, then $P(A - B) = \dots\dots\dots$
- (a) 0.7 (b) 0.5 (c) 0.3 (d) 0.2
- 2 If the curve of the quadratic function f passes through the points $(4, 0)$, $(0, -8)$ and $(-2, 0)$, then the solution set of the equation $f(x) = 0$ in $\mathbb{R}$ is $\dots\dots\dots$
- (a) $\{4, 0\}$ (b) $\{8, 0\}$ (c) $\{-2, 4\}$ (d) $\{-2, 8\}$
- 3 If $f(x) = \frac{x+2}{x}$, then the domain of the multiplicative inverse of the function f is $\dots\dots\dots$
- (a) $\mathbb{R} - \{2\}$ (b) $\mathbb{R} - \{-2, 0\}$ (c) $\mathbb{R} - \{0\}$ (d) $\mathbb{R}$

[b] Find $n(x)$ in the simplest form , showing the domain of n : $n(x) = \frac{2x}{x^2-2x} - \frac{x+2}{x^2-4}$

Second Question :

[a] Choose the correct answer from the given choices :

- 1 The value of x which satisfies the equation : $x^2 = 9$, $x \in \mathbb{N}$ is $\dots\dots\dots$
- (a) -3 (b) 3 (c) ± 3 (d) $\sqrt{3}$
- 2 The solution set of the two equations : $x - y = 0$ and $xy = 9$ in $\mathbb{R} \times \mathbb{R}$ is $\dots\dots\dots$
- (a) $\{(0, 0)\}$ (b) $\{(-3, 3)\}$
 (c) $\{(3, 3)\}$ (d) $\{(3, 3), (-3, -3)\}$

3 The set of zeroes of $f : f(x) = -3x$ is

- (a) {zero} (b) $\{-3\}$ (c) $\{3\}$ (d) $\mathbb{R}$

[b] Find $n(x)$ in the simplest form, showing the domain of n :

$$n(x) = \frac{x^2 + 2x}{x^3 - 27} \div \frac{x+2}{x^3 + 3x + 9}$$

Third Question :

[a] Choose the correct answer from the given choices :

1 If $\sqrt{64 + 36} = 8 + x$, then $x = \dots\dots\dots$

- (a) 10 (b) 9 (c) 6 (d) 2

2 The two straight lines : $2x + y = 1$ and $4x + 2y = 7$ are

- (a) parallel. (b) coincident.
(c) intersecting and not perpendicular. (d) perpendicular.

3 The common domain of the two functions $n_1, n_2 : n_1(x) = \frac{7}{x-5}$ and $n_2(x) = \frac{8}{x-3}$ is

- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{5, 3\}$ (c) $\mathbb{R} - \{5\}$ (d) $\{5, 3\}$

[b] $n_1(x) = \frac{x+5}{x^2-25}$ and $n_2(x) = \frac{3}{3x-15}$, then show if $n_1 = n_2$, or not? (give the reason)

Fourth Question :

[a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$$x + y = 1 \text{ and } x - y = 3 \text{ (algebraically)}$$

[b] If A and B are two mutually exclusive events from a simple space of a random experiment and $P(A) = \frac{1}{3}$, $P(A \cup B) = \frac{7}{12}$, find : $P(B)$

Fifth Question :

[a] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - 2y = 0$ and $x^2 + y^2 = 20$

[b] Use the general formula to find in $\mathbb{R}$ the solution set of the equation :

$$x^2 - 4x + 1 = 0, \text{ where } \sqrt{3} \approx 1.7$$



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 If $x = 2$ is one of the solutions of the equation : $m x^2 + 2 x + 8 = 0$, then $m = \dots\dots\dots$
 (a) -3 (b) 4 (c) -2 (d) 3
- 2 If $n(x) = \frac{x}{x^2 + 1}$, then the domain of n is $\dots\dots\dots$
 (a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R}$ (c) $\mathbb{R} - \{1, -1\}$ (d) $\emptyset$
- 3 If the expression $x^2 + k x + 9$ is a perfect square , then $k = \dots\dots\dots$
 (a) ± 9 (b) ± 1 (c) ± 4 (d) ± 6
- 4 If $\{3, -3\}$ is the set of zeroes of the function f where $f(x) = x^2 + k$, then $k = \dots\dots\dots$
 (a) 3 (b) -3 (c) 9 (d) -9
- 5 If $n^{-1}(x) = \frac{3-x}{5-x}$, then the additive inverse of the algebraic fraction $n(x)$ is $\dots\dots\dots$
 (a) $\frac{5-x}{3-x}$ (b) $\frac{5+x}{3+x}$ (c) $\frac{x-5}{x+3}$ (d) $\frac{5-x}{x-3}$
- 6 If A and B are two events from the sample space of a random experiment , $P(A \cap B) = 0.2$, $P(A) = 0.6$, then $P(A - B) = \dots\dots\dots$
 (a) 0.4 (b) 0.6 (c) 0.2 (d) 0.8
- 7 If $x^3 y^3 = 8$, then $x^2 y^2 = \dots\dots\dots$
 (a) 2 (b) 16 (c) 4 (d) 12
- 8 If the domain of the function $n : n(x) = \frac{x-5}{2x-b}$ is $\mathbb{R} - \{3\}$, then $b = \dots\dots\dots$
 (a) -3 (b) 3 (c) 6 (d) -6
- 9 If the two equations $b x + 4 y = 7$, $3 x + a y = 21$ have an infinite number of solutions in $\mathbb{R} \times \mathbb{R}$, then $ab = \dots\dots\dots$
 (a) 12 (b) 7 (c) 21 (d) 9

Second Group :

► Answer the following questions :

- 10 By using the general formula find in $\mathbb{R}$ the solution set of the equation $x(x-5) = 7$ rounding the result to one decimal digit.

11 If $n(x) = \frac{x^2 - 2x}{x^3 - 3x + 2}$

(a) Find $n^{-1}(x)$ in the simplest form and identify the domain of n^{-1}

(b) Find the value of x if $n^{-1}(x) = 3$

12 Find algebraically the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$$3x + 2y = 7, \quad 2x + y = 4$$

13 A and B are two events in the sample space of a random experiment and $P(A) = 0.5$, $P(B) = 0.7$, $P(A \cup B) = 0.6$, find : $P(B)$, $P(A \cap B)$

14 If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, prove that : $n_1 = n_2$

15 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 1$, $y^2 = 13 - x^2$

16 If $n(x) = \frac{x^2 - 3x}{x^2 - 9} - \frac{1 - x}{x^2 + 2x - 3}$, find $n(x)$ in the simplest form and identify the domain of n



El-Beheira Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

1 The degree of the algebraic expression : $3x + 4y + x^2y$ is

- (a) first. (b) third. (c) second. (d) fourth.

2 If there is only one solution to the two equations : $x + 4y = 5$, $3x + ky = 12$, then $k \neq$

- (a) 12 (b) -4 (c) 4 (d) -12

3 Set of zeroes of the function $f : f(x) = 0$ is

- (a) $\mathbb{R} - \{0\}$ (b) $\emptyset$ (c) $\mathbb{R}$ (d) $\{0\}$

4 The domain of multiplicative inverse of the algebraic fraction $\frac{x+2}{x-3}$ is

- (a) $\mathbb{R} - \{-2\}$ (b) $\mathbb{R} - \{-2, 3\}$ (c) $\mathbb{R} - \{3\}$ (d) $\{-2, 3\}$

5 If X is an event of a random experiment S , and if $P(\bar{X}) = 2P(X)$, then $P(X) =$

- (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) 1 (d) $\frac{2}{3}$

6 If $f(x) = \frac{x-5}{5-x}$, $x \neq 5$, then $f(x)$ in the simplest form is

- (a) -1 (b) 1 (c) 5 (d) -5

- 7 If $\sqrt{x^2} = 25$, then $x = \dots\dots\dots$
- (a) 5 (b) ± 5 (c) 25 (d) ± 25
- 8 If $\frac{1}{x} + \frac{1}{y} + \frac{1}{xy} = \frac{k}{xy}$, then $k = \dots\dots\dots$
- (a) xy (b) $x + y$ (c) 3 (d) $x + y + 1$
- 9 The curve of $y = ax^2 + bx + c$ intersects y-axis at the point $\dots\dots\dots$
- (a) $(c, 0)$ (b) $(0, b)$ (c) $(0, c)$ (d) $(b, 0)$

Second Group :

► Answer the following questions :

- 10 Find algebraically the solution set of the two equations in $\mathbb{R} \times \mathbb{R}$:

$$3x + y = 9, \quad 2x - y = 1$$

- 11 Find $n(x)$ in the simplest form, showing the domain :

$$n(x) = \frac{x^2 + 6x + 8}{x^2 - 4} - \frac{x^2 - 5x}{x^2 - 7x + 10}$$

- 12 Find the solution set of the equation in $\mathbb{R}$:

$$x^2 + 2x - 4 = 0 \text{ rounding the result to the nearest two decimal digits.}$$

- 13 Find $n(x)$ in the simplest form, showing the domain if :

$$n(x) = \frac{x^2 - 5x + 6}{x^3 - 8} \div \frac{x - 3}{x^2 + 2x + 4}$$

- 14 Find the solution set of the two equation in $\mathbb{R} \times \mathbb{R}$ if : $x - y = 1$, $x^2 - xy = 3$

- 15 If $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$, prove that : $n_1 = n_2$

- 16 If A, B are two events in a random experiment and if $P(A) = 0.7$, $P(B) = 0.6$, $P(A \cap B) = 0.4$, find each of the following :

(1) $P(\bar{A})$

(2) $P(A \cup B)$

(3) $P(A - B)$

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El-Fayoum Governorate



Answer the following questions :

First Question :

► Choose the correct answer from those given :

- 1 The domain of the function $f : f(x) = 2x^{-3}$ is $\dots\dots\dots$
- (a) $\{2\}$ (b) $\{-2\}$ (c) $\mathbb{R} - \{-3\}$ (d) $\mathbb{R} - \{0\}$

- 2 If $3^x = 9$, then $3^{x+1} = \dots\dots\dots$
- (a) 3 (b) 9 (c) 27 (d) 81
- 3 If A and B are two mutually exclusive events from the sample space of a random experiment and $P(A) = 0.3$, $P(A \cup B) = 0.6$, then $P(\bar{B}) = \dots\dots\dots$
- (a) 0.3 (b) 0.6 (c) 0.7 (d) 0.9
- 4 The set of zeroes of the function $f : f(x) = \frac{x-3}{x+2}$ is $\dots\dots\dots$
- (a) $\{3\}$ (b) $\{-2\}$ (c) $\{-3\}$ (d) $\{2\}$
- 5 If $\sqrt{36 + 64} = 8 + x$, then $x = \dots\dots\dots$
- (a) 6 (b) 9 (c) 10 (d) 2
- 6 The simplest form of the function $f : f(x) = \frac{x-7}{7-x}$, $x \neq 7$ is $\dots\dots\dots$
- (a) 1 (b) -1 (c) 7 (d) -7

Second Question :

► Answer the following questions :

[a] Find in $\mathbb{R} \times \mathbb{R}$ the set of solutions of the following two equations algebraically :

$$y - x = -3, \quad x^2 + y^2 = 5$$

[b] Find $n(x)$ in simplest form, showing the domain :

$$n(x) = \frac{3x^2 - 6x}{x^2 - 4} \div \frac{x^2 + x}{x^2 + 3x + 2}$$

Third Question :

[a] Find $n(x)$ in the simplest form, showing the domain :

$$n(x) = \frac{2x-6}{x^2-9} - \frac{8}{3-x^2-2x}$$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the set of solutions of the following two equations algebraically :

$$2y = x - 5, \quad 4x = 2 - y$$

Fourth Question :

[a] Find using the general formula, the solution set of the following equation at $\mathbb{R}$:

$$x^2 = 4 + 2x \text{ (Round the result to the nearest two decimal places).}$$

[b] If A and B are two events of an experiment from the sample space of a random experiment and $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, find

(1) $P(\bar{A})$

(2) $P(A \cup B)$

(3) $P(B - A)$

Fifth Question :

[a] If $n_1(x) = \frac{2x}{2x+4}$, $n_2(x) = \frac{x^2+2x}{x^2+4x+4}$, is $n_1 = n_2$?

[b] Choose the correct answer from those given :

- 1 If $n(x) = \frac{x-3}{x+2}$, then the domain of n^{-1} is
 (a) $\{-3\}$ (b) $\{-2\}$ (c) $\mathbb{R} - \{-3, 2\}$ (d) $\mathbb{R} - \{-2, 3\}$
- 2 If the S.S. of the equation : $x^2 - ax + 4 = 0$ in $\mathbb{R}$ is $\emptyset$, then a can be =
 (a) -5 (b) 0 (c) 4 (d) 5
- 3 The two lines $x + 5 = 0$, $2y + 6 = 0$, are intersecting in the quadrant.
 (a) first (b) second (c) third (d) forth

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Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

First Question :

► Choose the correct answer from those given :

- 1 If $\sqrt[3]{x} = \sqrt[3]{8}$, then $x =$
 (a) 2 (b) 4 (c) 16 (d) 64
- 2 If the two straight lines representing the two equations : $x + 3y = 5$, $x + ky = 9$ are parallel, then $k =$
 (a) 3 (b) 5 (c) 7 (d) 9
- 3 If A and B are two mutually exclusive events from the sample space of a random experiment, then $P(A \cap B) =$
 (a) 1 (b) 0.5 (c) zero (d) $\emptyset$
- 4 The set of zeroes of the function $f : f(x) = 2x(x^2 - 2x + 1)$ is
 (a) $\{0\}$ (b) $\{0, 1\}$ (c) $\{0, -1\}$ (d) $\{0, 1, -1\}$
- 5 If the curve of the quadratic function f passes through the points $(-1, 0)$, $(0, -4)$ and $(4, 0)$, then the solution set of the equation $f(x) = 0$ in $\mathbb{R}$ is
 (a) $\{0, -1\}$ (b) $\{-1, -4\}$ (c) $\{-1, 4\}$ (d) $\{4, -4\}$
- 6 If $n(x) = \frac{x-5}{x+2}$, then the domain of n^{-1} is
 (a) $\mathbb{R} - \{-2\}$ (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R} - \{2, -5\}$ (d) $\mathbb{R} - \{5, -2\}$

Second Question :

[a] Choose the correct answer from those given :

[1] If $x^2 - y^2 = 2(x + y)$ where $x + y \neq 0$, then $x - y = \dots\dots\dots$

- (a) 8 (b) 6 (c) 4 (d) 2

[2] The simplest form of the function $f : f(x) = \frac{3-x}{x-3}$ where $x \neq 3$ is $\dots\dots\dots$

- (a) -1 (b) zero (c) 1 (d) 3

[3] If the common domain of the two functions n_1 and $n_2 : n_1(x) = \frac{3}{x}$, $n_2(x) = \frac{5}{x+k}$ is $\mathbb{R} - \{0, 2\}$, then $k = \dots\dots\dots$

- (a) 2 (b) -2 (c) -3 (d) -5

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $y - x = 2$, $x^2 + xy - 4 = 0$

Third Question :

[a] Find $n(x)$ in the simplest form, showing the domain of the function n where :

$$n(x) = \frac{x-2}{x^2-4} + \frac{2x+6}{x^2+5x+6}$$

[b] Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

$$x = 3y + 7, \quad x + 2y = 12$$

Fourth Question :

[a] If $n(x) = \frac{x^2 + 14x + 49}{x^3 - 8} \div \frac{x+7}{x-2}$, then find $n(x)$ in the simplest form and identify the domain of n , then find $n(-1)$

[b] By using the general formula, find in $\mathbb{R}$ the solution set of the equation : $x^2 = 5 - 2x$ approximating the result to the nearest two decimal places.

Fifth Question :

[a] If $n_1(x) = \frac{3}{x-1} - \frac{2}{x-1}$, $n_2(x) = \frac{x^2}{x^3 - x^2}$, prove that : $n_1(x) = n_2(x)$ for all values of x which belong to the common domain and find this domain.

[b] If A and B are two events from the sample space of a random experiment, $P(A) = 0.7$ and $P(A - B) = 0.5$, find : $P(\bar{A})$, $P(A \cap B)$



Answer the following questions : (Calculator is allowed)

First Question :

► Choose the correct answer from those given :

- 1 If the two straight lines which represent the two equations : $x + 3y = 14$, $2x + ky = 5$ are parallel , then $k = \dots\dots\dots$
 - (a) 3
 - (b) 5
 - (c) 6
 - (d) 12
- 2 The set of zeroes of the function $n : n(x) = \frac{x^2 - x - 2}{x^2 + 4}$ is $\dots\dots\dots$
 - (a) $\emptyset$
 - (b) $\mathbb{R}$
 - (c) $\{2, -1\}$
 - (d) $\{-2, 2\}$
- 3 If $2^x = 3$, then $8^x = \dots\dots\dots$
 - (a) 3
 - (b) 6
 - (c) 9
 - (d) 27
- 4 If $\frac{x+5}{x+3}$ is the multiplicative inverse of the algebraic fraction $\frac{x-a}{x+5}$, then $a = \dots\dots\dots$
 - (a) 3
 - (b) -5
 - (c) -3
 - (d) 5
- 5 If A and B are two events of a sample space , $A \subset B$, then $P(A \cup B) = \dots\dots\dots$
 - (a) $P(A)$
 - (b) $P(B)$
 - (c) $P(A \cap B)$
 - (d) zero
- 6 The common domain of the two fractions : $\frac{2x}{x-3}$, $\frac{7x+1}{2x-6}$ is $\dots\dots\dots$
 - (a) $\mathbb{R}$
 - (b) $\mathbb{R} - \{0, 3\}$
 - (c) $\mathbb{R} - \{3\}$
 - (d) $\mathbb{R} - \{3, -3\}$

Second Question :

[a] Choose the correct answer from those given :

- 1 The number of solutions of the two equations : $x - 2y = 1$, $3x + y = 10$ in $\mathbb{R} \times \mathbb{R}$ is $\dots\dots\dots$
 - (a) zero
 - (b) 1
 - (c) 2
 - (d) an infinite number.
- 2 If $n(x) = \frac{x-1}{x+3}$, then the domain of n^{-1} is $\dots\dots\dots$
 - (a) $\mathbb{R} - \{-3\}$
 - (b) $\mathbb{R} - \{1\}$
 - (c) $\mathbb{R} - \{1, -3\}$
 - (d) $\mathbb{R}$
- 3 $\sqrt{144 + 25} = 12 + \dots\dots\dots$
 - (a) -2
 - (b) 1
 - (c) 4
 - (d) 5

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x = 3$, $x^2 + y^2 = 25$

Third Question :

[a] Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x^2 + x}{x^2 - 1} - \frac{x - 5}{x^2 - 6x + 5}$$

[b] Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $2x + y = 10$, $x - y = 2$

Fourth Question :

[a] Find $n(x)$ in the simplest form, showing the domain where :

$$n(x) = \frac{x^3 - 27}{x^2 - 5x + 6} \div \frac{x^2 + 3x + 9}{x - 2}$$

[b] By using the general form find in $\mathbb{R}$ the solution set of the equation :
 $x^2 + 3x = 1$ (to the nearest one decimal place)

Fifth Question :

[a] If $n_1(x) = \frac{1}{x}$, $n_2(x) = \frac{x^2 + 4}{x^3 + 4x}$, prove that : $n_1 = n_2$

[b] If A and B are two events in the sample space of a random experiment , $P(\bar{A}) = 0.6$
and $P(B) = 0.5$, $P(A \cap B) = 0.2$, find :

(1) $P(A)$

(2) $P(A \cup B)$

(3) $P(B - A)$



Souhag Governorate



Answer the following questions : (*Calculator is allowed*)

First Group :

► Choose the correct answer :

1 The solution set of the equation : $x^2 - x = 0$ in $\mathbb{R}$ is

(a) $\{1\}$

(b) $\{0, 1\}$

(c) $\{-1\}$

(d) $\{0, -1\}$

2 The two straight lines : $3x + 5y = 0$, $5x - 3y = 0$ are intersecting at

(a) the origin point.

(b) the 1st quadrant.

(c) the 2nd quadrant.

(d) the 4th quadrant.

3 The function $f : f(x) = \frac{x-2}{x-5}$ has an additive inverse in the domain

(a) $\mathbb{R} - \{-5\}$

(b) $\mathbb{R} - \{5\}$

(c) $\mathbb{R}$

(d) $\mathbb{R} - \{2, 5\}$

- 4 If $x \in \mathbb{R} - \{0, 1\}$, then $\frac{1-x}{x} \div \frac{x-1}{x}$ (in the simplest form) is
- (a) 1 (b) x (c) -1 (d) $x-1$
- 5 If A and B are two mutually exclusive events in the sample space of a random experiment, where $P(A) = \frac{3}{5}$ and $P(B) = \frac{2}{5}$, then $P(A \cap B) = \dots\dots\dots$
- (a) $\emptyset$ (b) $\frac{1}{5}$ (c) 1 (d) zero
- 6 If $5^x = 3$, then $5^{x+1} = \dots\dots\dots$
- (a) 8 (b) 15 (c) 11 (d) 30
- 7 If $\{-3, 3\}$ is the set of zeroes of the function $f : f(x) = x^2 + a$, then $a = \dots\dots\dots$
- (a) 9 (b) -9 (c) -3 (d) 3
- 8 A number formed from two digits its units digit = its tens digit = x , then the number is
- (a) $10x^2$ (b) $10x$ (c) $11x$ (d) $11x^2$
- 9 If $n_1(x) = \frac{x+1}{x-2}$ and $n_2(x) = \frac{x^2+x}{x^2-2x}$, then the common domain in which n_1 and n_2 are equal is
- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{2\}$ (c) $\mathbb{R} - \{-1, 2\}$ (d) $\mathbb{R} - \{0, 2\}$

Second Group :

► Answer the following questions :

- 10 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 4$, $3x + 2y = 7$
- 11 If $n(x) = \frac{x+1}{x^2-x-2} \times \frac{x^2+3x-10}{3x^2+16x+5}$, find :
- (1) $n(x)$ in the simplest form showing the domain.
- (2) $n(0)$ and $n(-1)$ if it is possible.
- 12 If A and B are two events from the sample space of a random experiment, where $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, find :
- (1) The probability of occurring one of the two events at least.
- (2) $P(B - A)$ (3) $P(\bar{A})$
- 13 By using the general formula find in $\mathbb{R}$ the solution set of the equation :
- $x^2 - 6x + 4 = 0$ (approximating the result to the nearest two decimal places)
- 14 If $n(x) = \frac{x^2+2x+4}{x^3-8} + \frac{x^2-9}{x^2+x-6}$, find $n(x)$ in the simplest form showing the domain.

15 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations : $x - y = 2$, $x^2 + y^2 = 10$

16 If $n(x) = \frac{x^2 - 2x}{(x-2)(x^2+2)}$

(1) Find $n^{-1}(x)$ in the simplest form showing the domain.

(2) If $n^{-1}(x) = 3$, find the value of x

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Qena Governorate



Answer the following questions : (Calculator is allowed)

First Question :

[a] Choose the correct answer from those given :

1 If $x - y = 3$, $x^2 - y^2 = 12$, then $x + y = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 12

2 If $n(x) = \frac{x-3}{7}$, then the domain of $n^{-1} = \dots\dots\dots$

- (a) $\mathbb{R}$ (b) $\mathbb{R} - \{7\}$ (c) $\mathbb{R} - \{3\}$ (d) $\mathbb{R} - \{7, 3\}$

3 The common domain of the two algebraic fractions : $\frac{x-3}{3}$, $\frac{x+2}{x}$ is $\dots\dots\dots$

- (a) $\mathbb{R} - \{3\}$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R} - \{3, -2\}$ (d) $\mathbb{R} - \{0, 3\}$

[b] If A and B are two events in a sample space of a random experiment and $P(A) = 0.5$, $P(B) = 0.7$, $P(A \cap B) = 0.4$, find : $P(B - A)$

Second Question :

[a] Choose the correct answer from those given :

1 The number of solution of the two equation : $x + y = 5$, $2x + 2y = 10$ together in $\mathbb{R} \times \mathbb{R}$ is $\dots\dots\dots$

- (a) zero (b) 1 (c) 2 (d) an infinite number.

2 The set of zeroes of the algebraic fraction : $\frac{x-3}{5}$ is $\dots\dots\dots$

- (a) $\mathbb{R}$ (b) $\emptyset$ (c) $\{3\}$ (d) $\mathbb{R} - \{3\}$

3 If A and B are two mutually exclusive events of a random experiment , then $P(A \cap B) = \dots\dots\dots$

- (a) $\{0\}$ (b) zero (c) $P(A)$ (d) $P(B)$

[b] Find $n(x)$ in the simplest form showing the domain where :

$$n(x) = \frac{x^3 - 8}{x^2 + x - 6} \div \frac{x^2 + 2x + 4}{3x + 9}$$

Third Question :

[a] Choose the correct answer from those given :

- 1 If $AB = 1$, $BC = 4$, $AC = 9$, such that A , B , C are positive real numbers , then $ABC = \dots\dots\dots$

(a) 2 (b) 4 (c) 6 (d) 8

- 2 The ordered pair which satisfies the two equations : $xy = 4$, $x = y$ together is $\dots\dots\dots$

(a) (2 , 2) (b) (-2 , 2) (c) (2 , -2) (d) (4 , 1)

- 3 If $n(x) = \frac{3x-6}{x-3}$, then $n^{-1}(2) = \dots\dots\dots$

(a) zero (b) 6 (c) $\frac{1}{2}$ (d) undefined

- [b] If $n_1(x) = \frac{x^2-x}{x^3-2x^2}$, $n_2(x) = \frac{x^2-3x+2}{x^3-4x^2+4x}$, prove that : $n_1 = n_2$

Fourth Question :

- [a] By using the general formula , find the solution set of the following equation , rounding the result to two decimal digits :

$$2x^2 + 5x - 1 = 0 \text{ , where } \sqrt{33} \approx 5.74$$

- [b] Solving in $\mathbb{R} \times \mathbb{R}$ the two equations : $xy = 3$, $x + y = 4$

Fifth Question :

- [a] Find in the common domain of the following two algebraic fractions : $\frac{x}{4-x^2}$, $\frac{5}{x+2}$

- [b] Two supplementary angles , one of them is four times the other , find the measure of each angle.



Luxor Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

- 1 The domain of the multiplicative inverse of $f(x) = \frac{x-2}{x+1}$ is $\dots\dots\dots$

(a) $\{-1\}$ (b) $\mathbb{R} - \{-1, 2\}$ (c) $\mathbb{R} - \{2\}$ (d) $\mathbb{R} - \{-1\}$

- 2 The number of solutions of $2x - y = 3$ in $\mathbb{R} \times \mathbb{R}$ is $\dots\dots\dots$

(a) 0 (b) 2 (c) 1 (d) an infinite.

- 3 If $(2^x, y^3) = (8, -27)$, then $x + y = \dots\dots\dots$
 (a) -6 (b) 6 (c) 0 (d) 5
- 4 If $(x + 5)^2 = x^2 + kx + 25$, then $k = \dots\dots\dots$
 (a) 5 (b) 7 (c) 10 (d) 1
- 5 If A and B are two events from the sample space of the random experiment and $A \subset B$, $A \neq B$, then $P(A \cup B) = \dots\dots\dots$
 (a) $P(B)$ (b) $P(A)$ (c) $P(A \cap B)$ (d) 0
- 6 The set of zeroes of $f : f(x) = 5x$ is $\dots\dots\dots$
 (a) $\{\frac{1}{5}\}$ (b) $\{0\}$ (c) 5 (d) $\emptyset$
- 7 If $z(f) = \{4, -4\}$, $f(x) = x^2 + a$, then $a = \dots\dots\dots$
 (a) 2 (b) -2 (c) ± 2 (d) -16
- 8 One of the solutions for the two equations : $x - y = 0$, $xy = 9$ is $\dots\dots\dots$
 (a) (3, -3) (b) (-3, 3) (c) (3, 3) (d) (9, 1)
- 9 The domain of $f : f(x) = \frac{5}{x-1}$ is $\dots\dots\dots$
 (a) $\{1\}$ (b) $\{5\}$ (c) $\mathbb{R} - \{1\}$ (d) $\mathbb{R} - \{5\}$

Second Group :

► Answer each of the following :

- 10 If $n(x) = \frac{x^2 - x}{x^2 - 3x + 2}$, find :
 [a] $n^{-1}(x)$ in the simplest form. [b] The domain of n^{-1}
- 11 By using the general formula find in $\mathbb{R}$ the solution of $x^2 - 4x + 2 = 0$ rounding the result to the nearest two decimal places.
- 12 Find $n(x)$ in the simplest form showing the domain : $n(x) = \frac{x^2 - 7x + 10}{x^2 - 6x + 5} \div x^2 - 2x$
- 13 A length of the rectangle is 2 cm more than its width and its perimeter is 28 cm, find its area.
- 14 Find the solution of : $x - y = 3$ and $xy = 10$ in $\mathbb{R} \times \mathbb{R}$
- 15 If $P(A) = \frac{2}{5}$, $P(B) = \frac{1}{3}$, find $P(A \cup B)$ in the following cases :
 [a] A and B are mutually exclusive events. [b] $P(A \cap B) = \frac{1}{15}$
- 16 If $n_1(x) = \frac{5x^3 + 10x}{(x^2 + 2)(x + 1)}$, $n_2(x) = \frac{5x}{x + 1}$, prove that : $n_1 = n_2$



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 The number of solutions of the following two equations : $3x + y = 4$, $2y + 6x = 3$ in $\mathbb{R} \times \mathbb{R}$ is
 (a) 1 (b) zero (c) infinite number. (d) $\emptyset$
- 2 $\sqrt{36 + 64} = 6 + \dots\dots\dots$
 (a) 8 (b) 10 (c) 4 (d) 14
- 3 If the curve of the quadratic function f does not intersect x -axis at any point , then the number of solutions of the equation $f(x) = \text{zero}$ in $\mathbb{R}$ is
 (a) two solutions. (b) an infinite number of solutions.
 (c) zero (d) one solution.
- 4 The set of zeroes of the function $f : f(x) = 5$ is
 (a) $\{5\}$ (b) $\{1\}$ (c) $\emptyset$ (d) $\{\text{zero}\}$
- 5 If $\bar{A}$ is the complement event of the event A , then $P(A \cap \bar{A}) = \dots\dots\dots$
 (a) $\emptyset$ (b) $\frac{1}{2}$ (c) 1 (d) zero
- 6 If $5^{x-3} = 1$, then $x = \dots\dots\dots$
 (a) 3 (b) -3 (c) zero (d) 1
- 7 The domain of the function $f : f(x) = \frac{x-3}{x^2-4}$ is
 (a) $\{2, -2\}$ (b) $\{3\}$ (c) $\mathbb{R} - \{2, -2\}$ (d) $\{2\}$
- 8 The simplest form of the function $f : f(x) = \frac{x-5}{5-x}$, $x \neq 5$ is
 (a) 5 (b) -5 (c) 1 (d) -1
- 9 If $n(x) = \frac{x+2}{x+5}$, then the domain of n^{-1} is
 (a) $\{-2, -5\}$ (b) $\{-2\}$ (c) $\{-5\}$ (d) $\mathbb{R} - \{-2, -5\}$

Second Group :

► Answer the following questions :

10 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations :

$$x = y \quad , \quad x^2 + y^2 = 50$$

11 If $n_1(x) = \frac{x}{x^2 - 4}$, $n_2(x) = \frac{2x}{2x^2 - 8}$, prove that : $n_1 = n_2$

12 If A , B are two mutually exclusive events in the sample space of a random experiment , $P(A) = \frac{1}{3}$, $P(A \cup B) = \frac{7}{12}$, find : $P(B)$

13 Find the solution set of the following equation by using the general formula
 $3x^2 = 5x - 1$ approximate the result to the nearest two decimal places.

14 Find $n(x)$ in its simplest form showing the domain : $n(x) = \frac{x^2}{x^2 + 2x} + \frac{2x - 4}{x^2 - 4}$

15 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the following two equations :

$$3x + y = 7 \quad , \quad x + y = 3$$

16 Find $n(x)$ in its simplest form showing the domain :

$$n(x) = \frac{x+1}{x^2 - x - 2} \times \frac{x^2 + 3x - 10}{3x^2 + 16x + 5}$$

Model Examinations of the School Book of Geometry



Model 1

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 The inscribed angle drawn in a semicircle is angle.

(a) an acute (b) an obtuse (c) a straight (d) a right

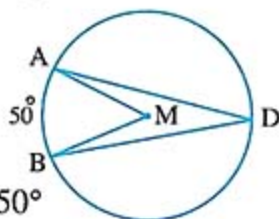
2 In the opposite figure :

Circle of centre M

If $m(\widehat{AB}) = 50^\circ$, then $m(\angle ADB) = \dots\dots\dots$

(a) 25° (b) 50° (c) 100°

(d) 150°



- 3 The number of symmetric axes of any circle is

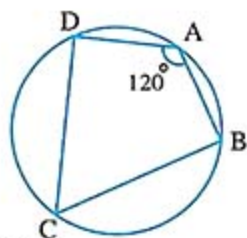
(a) zero (b) 1 (c) 2 (d) an infinite number.

4 In the opposite figure :

If $m(\angle A) = 120^\circ$, then $m(\angle C) = \dots\dots\dots$

(a) 60° (b) 90°

(c) 120° (d) 180°



- 5 If the straight line L is a tangent to the circle M of diameter length 8 cm., then the distance between L and the centre of the circle equals cm.

(a) 3 (b) 4 (c) 6 (d) 8

- 6 The surface of the circle M $\cap$ the surface of the circle N = {A} and the radius length of one of them is 3 cm. and $MN = 8$ cm. , then the radius length of the other circle equals cm.

(a) 5 (b) 6 (c) 11 (d) 16

2 [a] Complete and prove that :

In a cyclic quadrilateral , each two opposite angles are

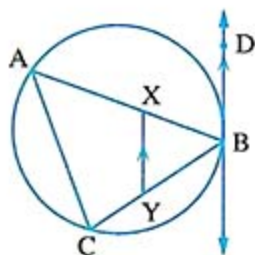
[b] In the opposite figure :

ABC is a triangle inscribed in a circle

, $\overleftrightarrow{BD}$ is a tangent to the circle at B

, $X \in \overline{AB}$, $Y \in \overline{BC}$ where $\overline{XY} \parallel \overline{BD}$

Prove that : AXYC is a cyclic quadrilateral.



3 [a] In the opposite figure :

Two circles are touching internally at B

, $\overline{AB}$ is a common tangent

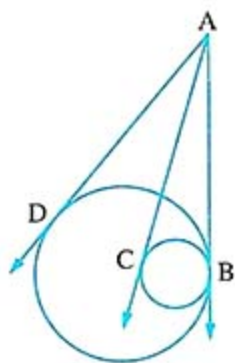
, $\overline{AC}$ is a tangent to the smaller circle at C

, $\overline{AD}$ is a tangent to the greater circle at D

, $AC = 15$ cm. , $AB = (2x - 3)$ cm.

and $AD = (y - 2)$ cm.

Find : The value of each of x and y



[b] In the opposite figure :

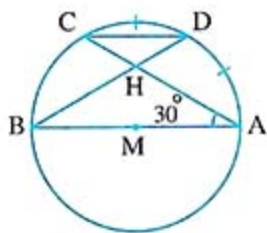
$\overline{AB}$ is a diameter in the circle M

, $C \in$ the circle M , $m(\angle CAB) = 30^\circ$

, D is the midpoint of $\widehat{AC}$, $\overline{DB} \cap \overline{AC} = \{H\}$

1 Find : $m(\angle BDC)$ and $m(\widehat{AD})$

2 Prove that : $\overline{AB} \parallel \overline{DC}$



4 [a] In the opposite figure :

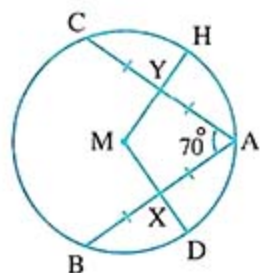
$\overline{AB}$ and $\overline{AC}$ are two chords equal in length in circle M

, X is the midpoint of $\overline{AB}$, Y is the midpoint of $\overline{AC}$

, $m(\angle CAB) = 70^\circ$

1 Calculate : $m(\angle DMH)$

2 Prove that : $XD = YH$



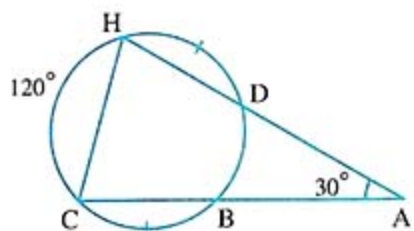
[b] In the opposite figure :

$m(\angle A) = 30^\circ$, $m(\widehat{HC}) = 120^\circ$

, $m(\widehat{BC}) = m(\widehat{DH})$

1 Find : $m(\widehat{BD})$ the minor

2 Prove that : $AB = AD$

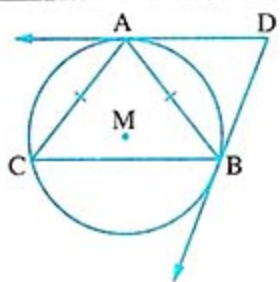


5 [a] In the opposite figure :

$\overline{DA}$ and $\overline{DB}$ are two tangents of the circle M

and $AB = AC$

Prove that : $\overline{AC}$ is a tangent-segment to the circle passing through the vertices of the triangle ABD

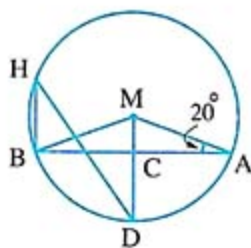


[b] In the opposite figure :

C is the midpoint of $\overline{AB}$, $\overline{MC} \cap$ the circle $M = \{D\}$

, $m(\angle MAB) = 20^\circ$

Find : $m(\angle BHD)$ and $m(\widehat{ADB})$



Model 2

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The measure of the arc which equals half the measure of the circle equals

- (a) 360° (b) 180° (c) 120° (d) 90°

2 The number of common tangents of two touching circles externally equals

- (a) 0 (b) 1 (c) 2 (d) 3

3 The measure of the inscribed angle drawn in a semicircle equals

- (a) 45° (b) 90° (c) 120° (d) 80°

4 The angle of tangency is included between

- (a) two chords. (b) two tangents.
(c) a chord and a tangent. (d) a chord and a diameter.

5 ABCD is a cyclic quadrilateral, $m(\angle A) = 60^\circ$, then $m(\angle C) =$

- (a) 60° (b) 30° (c) 90° (d) 120°

6 If M, N are two touching circles internally, their radii lengths are 5 cm. , 9 cm. , then $MN =$ cm.

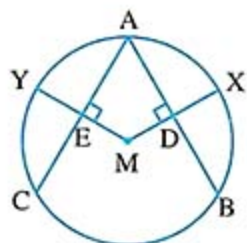
- (a) 14 (b) 4 (c) 5 (d) 9

2 [a] In the opposite figure :

$AB = AC$, $\overline{MD} \perp \overline{AB}$,

$\overline{ME} \perp \overline{AC}$

Prove that : $XD = YE$



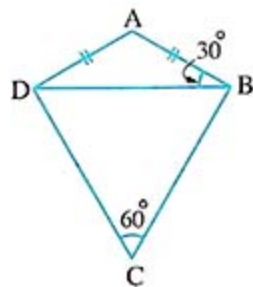
[b] In the opposite figure :

ABCD is a quadrilateral in which $AB = AD$,

$m(\angle ABD) = 30^\circ$,

$m(\angle C) = 60^\circ$

Prove that : ABCD is a cyclic quadrilateral.



3 [a] State two cases of a cyclic quadrilateral.

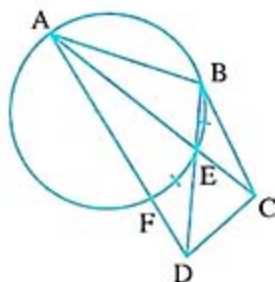
[b] In the opposite figure :

$\overline{BC}$ is a tangent-segment at B ,

E is the midpoint of $\widehat{BF}$

Prove that :

ABCD is a cyclic quadrilateral.



4 [a] In the opposite figure :

A circle is drawn touching

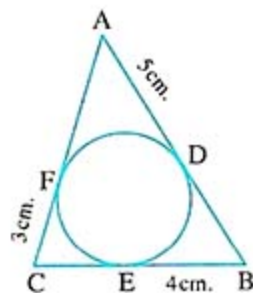
the sides of the triangle

ABC , $\overline{AB}$, $\overline{BC}$, $\overline{AC}$ at

D , E , F , $AD = 5$ cm ,

$BE = 4$ cm. , $CF = 3$ cm.

Find the perimeter of $\triangle ABC$



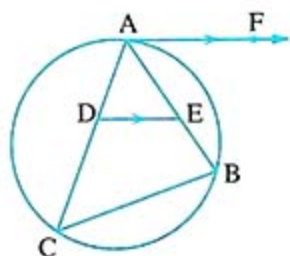
[b] In the opposite figure :

$\overline{AF}$ is a tangent to the

circle at A , $\overline{AF} \parallel \overline{DE}$

Prove that :

DEBC is a cyclic quadrilateral.



5 In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangents

to the circle at B , C

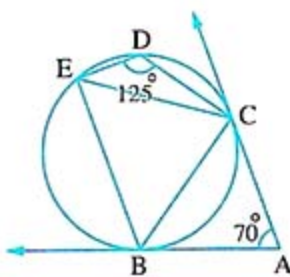
, $m(\angle A) = 70^\circ$

, $m(\angle CDE) = 125^\circ$

Prove that :

1 $CB = CE$

2 $\overline{AC} \parallel \overline{BE}$



Governorates' Examinations on Geometry



1

Cairo Governorate

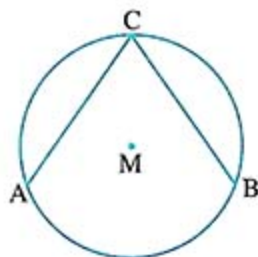


Answer the following questions :

First Group :

► Choose the correct answer from those given :

- 1 If ABCD is a cyclic quadrilateral , then $m(\angle A) + m(\angle C) - 120^\circ = \dots\dots\dots^\circ$
 (a) 30 (b) 60 (c) 120 (d) 240
- 2 If the point X lies on the circle M , $MX = 4$ cm. , then the radius length of the circle equals $\dots\dots\dots$ cm.
 (a) 2 (b) 4 (c) 8 (d) 16
- 3 If the two supplementary angles are equal in measure , then the measure of each angle = $\dots\dots\dots^\circ$
 (a) 90 (b) 60 (c) 45 (d) 30
- 4 If $\overline{AB}$, $\overline{AC}$ are two chords in a cricle , such that $AB = 5$ cm. , $AC = 3$ cm. , then the perpendicular distance from the center to $\overline{AB}$ $\dots\dots\dots$ the perpendicular distance from the center to $\overline{AC}$
 (a) < (b) $\geq$ (c) = (d) >
- 5 In the opposite figure :
 The measure of the inscribed angle ACB which opposite to the minor arc $\widehat{AB}$ may be equal to $\dots\dots\dots^\circ$
 (a) 100 (b) 95
 (c) 90 (d) 70
- 6 If $AB = 10$ cm. , then the circumference of the smallest circle passes through the two points A and B equals $\dots\dots\dots$ cm.
 (a) 10 (b) 25 (c) 10π (d) 25π
- 7 The measure of the inscribed angle is $\dots\dots\dots$ the measure of the arc opposite to it.
 (a) double (b) half (c) third (d) equal to
- 8 The set of points of the circle $\cup$ the set of points inside the circle is called $\dots\dots\dots$ of the circle.
 (a) circumference (b) diameter (c) chord (d) surface



- 9 In $\triangle ABC$, if $(AC)^2 > (AB)^2 + (BC)^2$, then $\angle B$ is

(a) right. (b) obtuse. (c) acute. (d) straight.

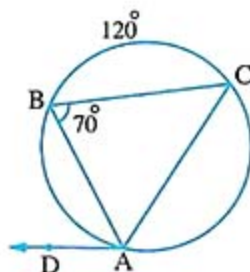
Second Group :

► Answer the following questions showing the steps of solution :

- 10 In the opposite figure :

$\overrightarrow{AD}$ is a tangent to the circle at A
 $m(\widehat{BC}) = 120^\circ$, $m(\angle ABC) = 70^\circ$

Find : $m(\angle BAD)$



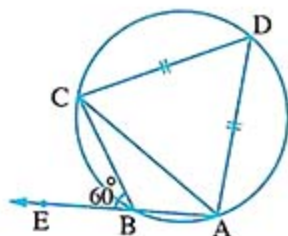
- 11 In the opposite figure :

ABCD is a quadrilateral inscribed in a circle

$E \in \overline{AB}$, $DC = DA$, $m(\angle CBE) = 60^\circ$

(1) Find : $m(\angle ADC)$

(2) Prove that : ACD is an equilateral triangle.



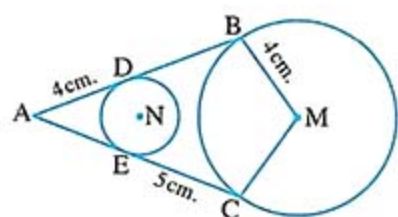
- 12 In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangent segments to the circle N at D, E and to the circle M at B, C, $EC = 5$ cm.

, $AD = BM = 4$ cm.

Find : (1) The length of $\overline{DB}$

(2) The perimeter of the quadrilateral ABMC



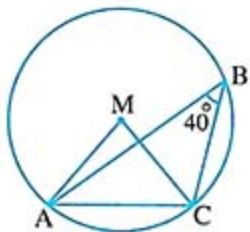
- 13 In the opposite figure :

The points A, B and C lie on the circle M

, $m(\angle ABC) = 40^\circ$

Find : (1) $m(\angle AMC)$

(2) $m(\angle ACM)$



- 14 In the opposite figure :

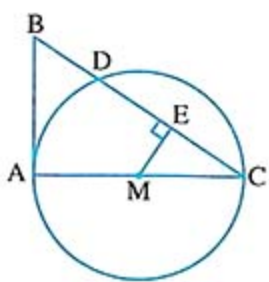
$\overline{AC}$ is a diameter in the circle M

, $\overline{AB}$ is a tangent segment to it at A

, $\overline{BC}$ intersects the circle at D, $\overline{ME} \perp \overline{BC}$

(1) Prove that : ABEM is a cyclic quadrilateral.

(2) If $DC = 7$ cm., find the length of $\overline{DE}$



- 15 If M, N are two circles their radii lengths are 10 cm. and 5 cm. respectively, determine the position of each one of them with respect to the other in each of the following cases :

(1) $MN = 16$ cm.

(2) $MN = 2$ cm.

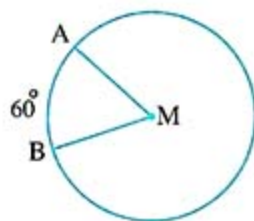
- 16 In the opposite figure :

A circle M, its radius length is 21 cm.

, $m(\widehat{AB}) = 60^\circ$, find :

(1) $m(\angle AMB)$

(2) The length of $\widehat{AB}$ (where : $\pi = \frac{22}{7}$)



Giza Governorate

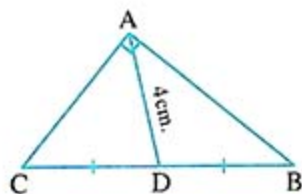


Answer the following questions :

First Group :

- Choose the correct answer :

- 1 The angle whose measure is 50° supplements an angle of measure $^\circ$
 (a) 130 (b) 40 (c) 310 (d) 60
- 2 The measure of the arc which represents $\frac{1}{3}$ of the measure of the circle equals $^\circ$
 (a) 60 (b) 90 (c) 120 (d) 240
- 3 In the opposite figure :
 ABC is a right-angled triangle at A
 If D is a midpoint of $\overline{BC}$ and $AD = 4$ cm.
 , then $BC =$ cm.
 (a) 4 (b) 6
 (c) 8 (d) 10
- 4 It is possible to draw a circle passing through the vertices of a
 (a) rhombus. (b) square. (c) parallelogram. (d) trapezium.
- 5 If two circles M and N are touching internally and the radius length of the circle M is 8 cm. and $MN = 3$ cm. , then the radius length of the circle N = cm.
 (a) 3 (b) 5 (c) 8 (d) 13
- 6 ABCD is a cyclic quadrilateral in which $m(\angle A) + m(\angle C) = 80^\circ +$ $^\circ$
 (a) 180 (b) 100 (c) 90 (d) zero



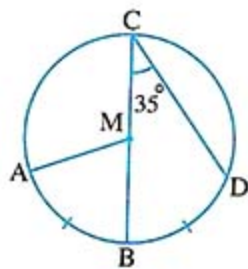
7 The inscribed angle which subtended by a major arc in a circle is

- (a) acute. (b) right. (c) obtuse. (d) reflex.

8 In the opposite figure :

If B is a midpoint of $\widehat{AD}$ and $m(\angle BCD) = 35^\circ$
 , then $m(\angle AMB) = \dots\dots\dots^\circ$

- (a) 35 (b) 70
 (c) 140 (d) 90



9 M is a circle of diameter length = 14 cm. , if the straight line L is a tangent to the circle M at A and $MA = (2x + 3)$ cm. , then $x = \dots\dots\dots$ cm.

- (a) 5 (b) 3 (c) 1 (d) 2

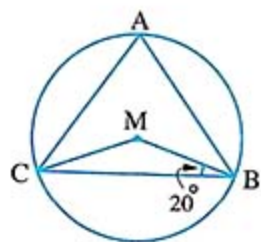
Second Group :

► Answer the following questions :

10 In the opposite figure :

ABC is a triangle inscribed in a circle M
 , $m(\angle MBC) = 20^\circ$

Find : $m(\angle BAC)$

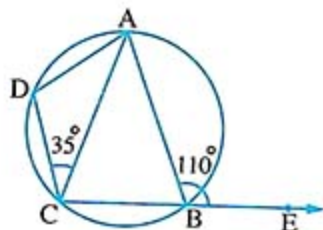


11 In the opposite figure :

$E \in \overrightarrow{CB}$, $m(\angle ABE) = 110^\circ$

and $m(\angle ACD) = 35^\circ$

Prove that : $m(\widehat{AD}) = m(\widehat{CD})$

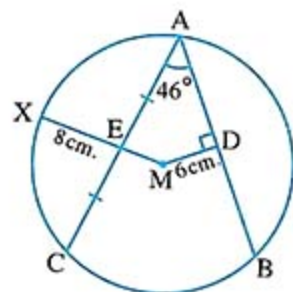


12 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two chords equal in length to the circle M , $\overline{MD} \perp \overline{AB}$, E is the midpoint of $\overline{AC}$
 , where $m(\angle CAB) = 46^\circ$, $MD = 6$ cm. and $EX = 8$ cm.

(1) Find : $m(\angle EMD)$

(2) Find the circumference of the circle M (where $\pi = \frac{22}{7}$)

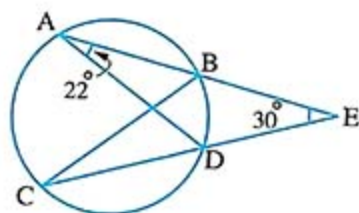


13 In the opposite figure :

$\overline{AB} \cap \overline{CD} = \{E\}$, $m(\angle AEC) = 30^\circ$

and $m(\angle EAD) = 22^\circ$

Find : $m(\widehat{AC})$

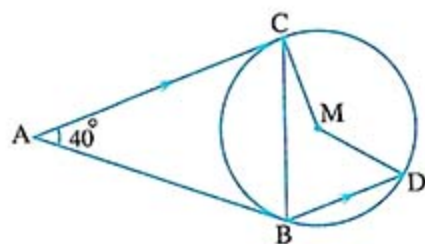


14 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangent segments to the circle M
 $\overline{AC} \parallel \overline{BD}$ and $m(\angle BAC) = 40^\circ$

(1) Prove that : $\overline{BC}$ bisects $\angle ABD$

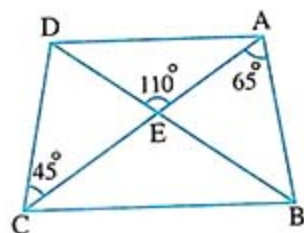
(2) Find : $m(\angle CMD)$



15 In the opposite figure :

ABCD is a quadrilateral its diagonals intersect at E , $m(\angle AED) = 110^\circ$,
 $m(\angle ACD) = 45^\circ$ and $m(\angle BAC) = 65^\circ$

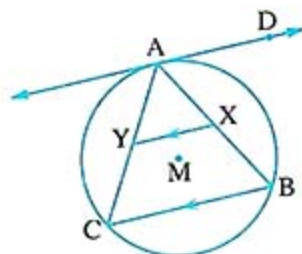
Prove that : ABCD is a cyclic quadrilateral.



16 In the opposite figure :

ABC is a triangle inscribed in a circle
 $\overline{AD}$ is a tangent to the circle M at A
 , and $\overline{XY} \parallel \overline{BC}$

Prove that : $\overline{AD}$ is a tangent to the circle passing through the points A , X and Y



Alexandria Governorate



Answer the following questions : (Calculator is allowed)

1 The point of intersection of medians of a triangle divides each median by the ratio from the vertex.

(a) 4 : 2

(b) 2 : 4

(c) 1 : 3

(d) 3 : 1

2 In the opposite figure :

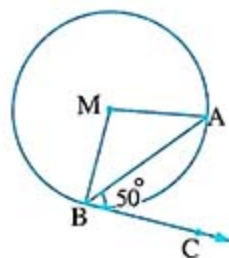
$\overline{BC}$ is a tangent to the circle M
 $m(\angle ABC) = 50^\circ$
 , then $m(\angle AMB) = \dots\dots\dots^\circ$

(a) 25

(b) 50

(c) 90

(d) 100



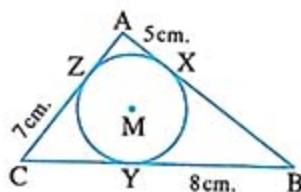
- 3 In a circle M, a chord of length 16 cm. is drawn, if the circumference of the circle is 20π cm., then the chord is at a distance of cm. from the center.

(a) 2 (b) 6 (c) 10 (d) 36

- 4 In the opposite figure :

M is the inscribed circle of the triangle ABC, touching the sides of the triangle ABC, $\overline{AB}$, $\overline{BC}$, $\overline{CA}$ at X, Y, Z respectively
 $AX = 5$ cm., $BY = 8$ cm., $CZ = 7$ cm.

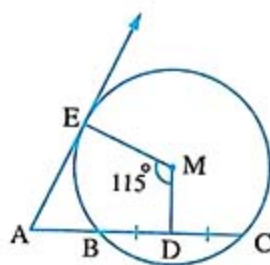
Find the perimeter of the triangle ABC



- 5 In the opposite figure :

A circle of center M, $m(\angle DME) = 115^\circ$
 D is the midpoint of $\overline{CB}$
 $\overline{AE}$ is tangent to the circle at E

Find with proof : $m(\angle EAD)$

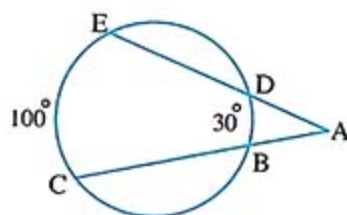


- 6 The measure of the inscribed angle drawn in a semicircle =
 (a) 180 (b) 120 (c) 90 (d) 45
- 7 The number of axis of symmetry of a circle is
 (a) 0 (b) 1 (c) 2 (d) infinite.
- 8 ABCD is a cyclic quadrilateral, if $m(\angle A) = 80^\circ$, then $m(\angle C) =$
 (a) 100 (b) 180 (c) 90 (d) 80
- 9 A circle of a radius length 21 cm., find the length of the arc drawn in the circle that measure = $\frac{3}{4}$ of the measure of the circle. ($\pi = \frac{22}{7}$)
- 10 The area of a rhombus of diagonals lengths 6 cm., 8 cm. equals cm^2
 (a) 14 (b) 10 (c) 24 (d) 48
- 11 A circle of 8 cm. length of diameter, if the straight line L is at a distance 3 cm. from the center, then the straight line L is of the circle.
 (a) tangent (b) secant
 (c) exterior (d) axis of symmetry

- 12 In the opposite figure :

$m(\widehat{EC}) = 100^\circ$, $m(\widehat{DB}) = 30^\circ$
 , then $m(\angle A) =$

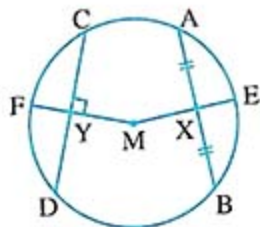
(a) 35 (b) 65
 (c) 70 (d) 130



13 In the opposite figure :

$\overline{AB}$, $\overline{CD}$ are two chords equals in length in the circle M, X is the midpoint of $\overline{AB}$, $\overline{MY} \perp \overline{CD}$

Prove that : $XE = YF$

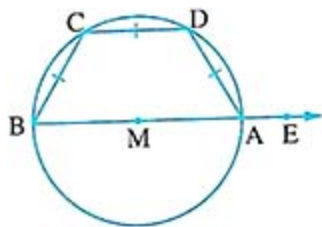


14 In the opposite figure :

ABCD is cyclic quadrilateral in the circle M, $\overline{AB}$ is a diameter in the circle, $AD = DC = CB$

(1) Prove that : $\overline{DC} \parallel \overline{AB}$

(2) Find : $m(\angle EAD)$



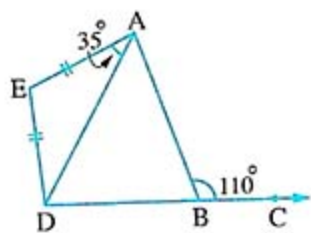
15 In the opposite figure :

$EA = ED$, $m(\angle DAE) = 35^\circ$

$m(\angle ABC) = 110^\circ$

(1) Find by proof : $m(\angle E)$

(2) Prove that : ABDE is a cyclic quadrilateral.



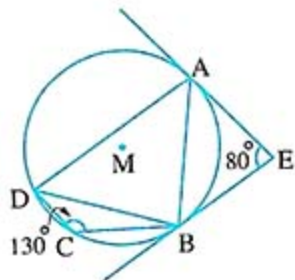
16 In the opposite figure :

$\overline{EA}$, $\overline{EB}$ are two tangent segment to the circle M at A and B, $m(\angle AEB) = 80^\circ$

$m(\angle DCB) = 130^\circ$ **Prove that :**

(1) BA = BD

(2) $\overline{AB}$ bisects $(\angle EAD)$



4

El-Kalyoubia Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

1 The least number of acute angles in a triangle is

(a) 0

(b) 1

(c) 2

(d) 3

2 If triangle ABC is a right-angled triangle at B, and D is the midpoint of $\overline{AC}$, and $BD = 4$ cm., then the length of $\overline{AC} = \dots\dots\dots$ cm.

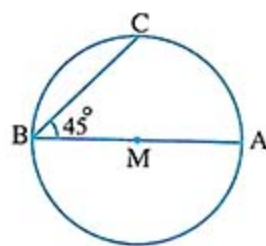
(a) 4

(b) 6

(c) 8

(d) 16

- 3 If A is a point lies inside a circle M its diameter 6 cm. , then $MA \in \dots\dots\dots$
- (a) $[0, 3]$ (b) $]0, 3[$ (c) $[0, 3[$ (d) $[0, 6[$
- 4 M and N are two circles touching internally , the lengths of their radii are 3 cm. and 8 cm. respectively , then the $MN = \dots\dots\dots$ cm.
- (a) 3 (b) 5 (c) 8 (d) 11
- 5 The smallest circle that can be drawn to pass through two points A and B , where $AB = 16$ cm. , its radius = $\dots\dots\dots$ cm.
- (a) 2 (b) 4 (c) 8 (d) 16
- 6 The longest chord in circle is called $\dots\dots\dots$
- (a) diameter. (b) tangent.
(c) radius. (d) perpendicular to the diameter.
- 7 In the opposite figure :
- $\overline{AB}$ is the diameter of circle M and $m(\angle ABC) = 45^\circ$
 , then $m(\widehat{BC}) = \dots\dots\dots^\circ$
- (a) 45 (b) 50
(c) 90 (d) 100
- 8 The measure of the central angle is $\dots\dots\dots$ the measure of the inscribed angle that subtends the same arc.
- (a) quarter (b) half (c) twice (d) there times
- 9 Which of the following polygons is a cyclic quadrilateral ?
- (a) Parallelogram. (b) Trapezium. (c) Rhombus. (d) Square.



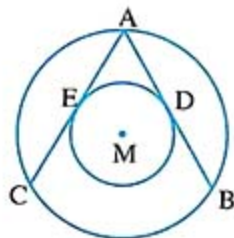
Second Group :

► Answer each of the following :

10 In the opposite figure :

Two concentric circles M , $\overline{AB}$ and $\overline{AC}$ are chords in the greater circle and are tangents to the smaller circle at points D and E respectively.

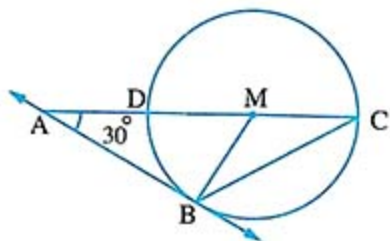
Prove that : $AB = AC$



11 In the opposite figure :

$\overline{AB}$ is a tangent to the circle M at B
 , $A \in \overline{CM}$, $m(\angle BAM) = 30^\circ$

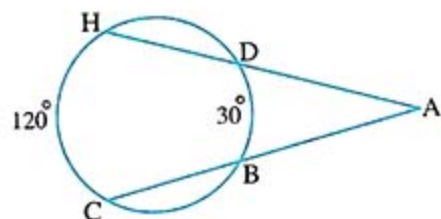
Find : $m(\angle BCA)$



12 In the opposite figure :

$$m(\widehat{CH}) = 120^\circ, m(\widehat{BD}) = 30^\circ$$

Find : $m(\angle A)$

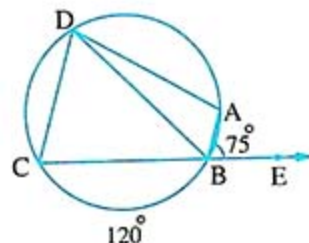


13 In the opposite figure :

$$E \in \overrightarrow{BC}, m(\angle ABE) = 75^\circ$$

$$, m(\widehat{BC}) = 120^\circ$$

Find : $m(\angle ADB)$

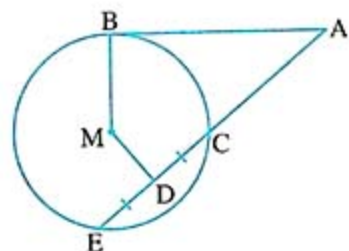


14 In the opposite figure :

$\overline{AB}$ is a tangent segment to the circle M at B

, D is midpoint of $\overline{CE}$

Prove that : The figure ABMD is cyclic quadrilateral.



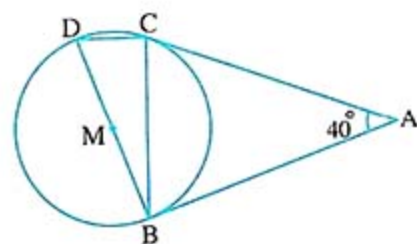
15 In the opposite figure :

$\overline{BD}$ is a diameter to the circle M, $\overline{AB}$ and $\overline{AC}$

are two tangents to the circle at B and C

, respectively , $m(\angle A) = 40^\circ$

Find : $m(\angle CBD)$

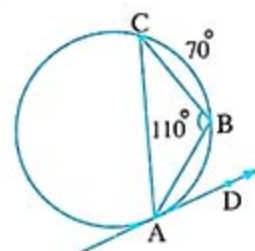


16 In the opposite figure :

$\overline{AD}$ is a tangent to the circle at A

, $m(\angle B) = 110^\circ$, $m(\widehat{BC}) = 70^\circ$

Find : $m(\angle BAD)$



5

El-Sharkia Governorate



Answer the following questions :

First Question :

[a] Choose the correct answer from the given ones :

1 If the area of square = 50 cm^2 , then area of the circle which passes through its vertices = $\pi \text{ cm}^2$

(a) 100

(b) 50

(c) 75

(d) 25

- 2 XYZL is cyclic quadrilateral where $m(\angle X) = (5m)^\circ$, $m(\angle Z) = (4m)^\circ$, then the value of $m = \dots\dots\dots^\circ$

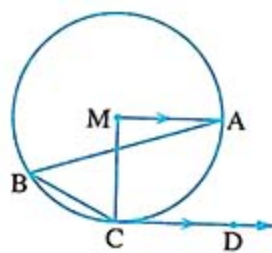
(a) 20 (b) 40 (c) 100 (d) 80

- 3 In the opposite figure :

$\overrightarrow{CD}$ tangent of circle M at C, $\overline{AM} \parallel \overrightarrow{CD}$

, then $m(\angle ABC) = \dots\dots\dots^\circ$

(a) 60 (b) 45
(c) 90 (d) 30



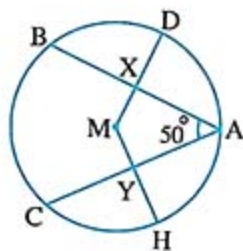
- [b] In the opposite figure :

$AB = AC$, X midpoint of $\overline{AB}$

, Y midpoint of $\overline{AC}$, $m(\angle A) = 50^\circ$

Find : (1) $m(\angle DMH)$

(2) Prove that : $DX = HY$



Second Question :

- [a] Choose the correct answer from the given ones :

- 1 Number of circles which passes through three collinear points =

(a) zero (b) 1 (c) 3 (d) infinite.

- 2 If M is a circle whose radius 6 cm., point A inside it where $MA = (2x - 4)$ cm., then $x \in \dots\dots\dots$

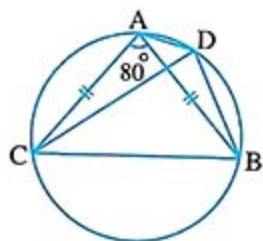
(a) $]2, 5[$ (b) $]2, \infty[$ (c) $] -\infty, 0[$ (d) $[2, 5[$

- 3 In the opposite figure :

$AB = AC$, $m(\angle BAC) = 80^\circ$

, then $m(\angle ADB) = \dots\dots\dots^\circ$

(a) 130 (b) 80
(c) 120 (d) 90

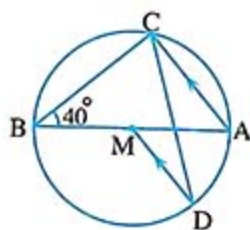


- [b] In the opposite figure :

$\overline{AB}$ diameter in circle M

, where $\overline{AC} \parallel \overline{MD}$, $m(\angle ABC) = 40^\circ$

Find : $m(\angle ACD)$



Third Question :

[a] Choose the correct answer from the given ones :

- 1 M, N two intersecting circles their radii 5 cm, 4 cm, then MN may be equal to cm.
 (a) 1 (b) 7 (c) 9 (d) 10
- 2 A rhombus whose diagonals are 6 cm, 8 cm, then its perimeter = cm.
 (a) 20 (b) 24 (c) 40 (d) 48
- 3 A circle whose radius 12 cm, then the length of the arc which subtended central angle 120° equal π cm.
 (a) 8 (b) 10 (c) 16 (d) 20

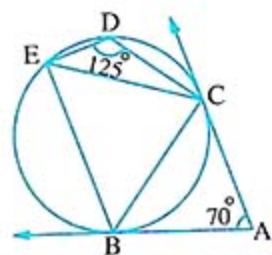
[b] In the opposite figure :

$\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents of a circle at B and C

, $m(\angle A) = 70^\circ$, $m(\angle D) = 125^\circ$

Prove that : (1) $BC = CE$

(2) $\overrightarrow{AC} \parallel \overrightarrow{BE}$



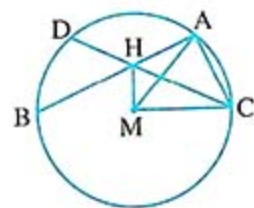
Fourth Question :

[a] In the opposite figure :

A circle M where $m(\widehat{AC}) = m(\widehat{BD})$

, $\overrightarrow{AB} \cap \overrightarrow{CD} = \{H\}$

Prove that : ACMH is a cyclic quadrilateral.



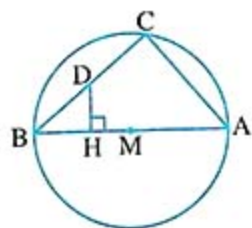
[b] In the opposite figure :

$\overrightarrow{AB}$ diameter of the circle M

, $\overrightarrow{DH} \perp \overrightarrow{AB}$

Prove that : (1) AHDC cyclic quadrilateral.

(2) $m(\angle BDH) = \frac{1}{2} m(\widehat{BC})$

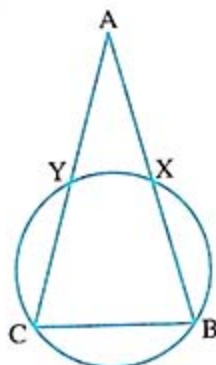


Fifth Question :

[a] In the opposite figure :

$m(\angle B) = m(\angle C)$

Prove that : $AX = AY$

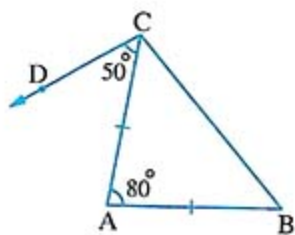


[b] In the opposite figure :

$$AB = AC, m(\angle A) = 80^\circ, m(\angle ACD) = 50^\circ$$

Prove that :

$\overrightarrow{CD}$ tangent to the circle which passes through the points A , B , C



6

El-Monofia Governorate



Answer the following questions : (Calculator is allowed)

First Question :

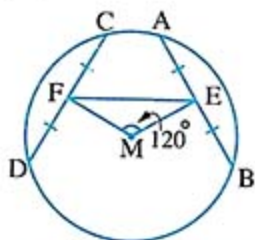
[a] Choose the correct answer :

- 1 The square of diagonal length 10 cm. , then its surface area = cm^2
(a) 100 (b) 25 (c) 50 (d) 20
- 2 If ABCD is a cyclic quadrilateral , then $m(\angle A) + m(\angle C) - 50^\circ = \dots\dots\dots^\circ$
(a) 180 (b) 130 (c) 150 (d) 100
- 3 ABC right angled-triangle , the length of two sides of right angle 6 cm. , 8 cm. , then the area of the circle passes through the vertices of $\Delta ABC = \dots\dots\dots \pi \text{ cm}^2$
(a) 36 (b) 64 (c) 25 (d) 100

[b] In the opposite figure :

If $AB = CD$, E , F are midpoints of $\overline{AB}$, $\overline{CD}$ respectively , $m(\angle EMF) = 120^\circ$

Find with proof : $m(\angle EFM)$



Second Question :

[a] Choose the correct answer :

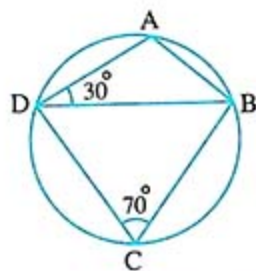
- 1 The numbers 5 , 4 , can be the lengths of sides of a triangle.
(a) 8 (b) 12 (c) 10 (d) 9
- 2 If M is a circle with diameter length 7 cm. , point A in its plane , $MA = 4 \text{ cm}$. , then point A lies
(a) outside the circle. (b) on the circle.
(c) inside the circle. (d) on the center of circle.
- 3 The measure of an inscribed angle drawn in a semicircle equals $^\circ$
(a) 120 (b) 180 (c) 108 (d) 90

[b] In the opposite figure :

ABCD is a cyclic quadrilateral

, $m(\angle ADB) = 30^\circ$, $m(\angle C) = 70^\circ$

Find with proof : $m(\angle ABD)$



Third Question :

[a] Choose the correct answer :

- 1 Two circles the lengths of their radii are 3 cm. , 7 cm. are touching if the distance between their centers $\in$

(a) $]4, 10[$ (b) $]10, \infty[$ (c) $]0, 4[$ (d) $\{4, 10\}$

- 2 A chord of length 6 cm. , is drawn in a circle of radius 5 cm. , then its distance from the center is cm.

(a) 3 (b) 4 (c) 5 (d) 6

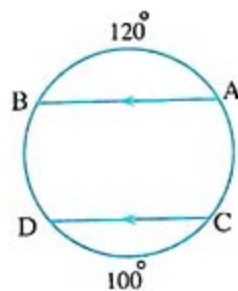
3 In the opposite figure :

If $\overline{AB} \parallel \overline{CD}$, $m(\widehat{AB}) = 120^\circ$

, $m(\widehat{CD}) = 100^\circ$

, then $m(\widehat{AC}) =$

(a) 50 (b) 60
(c) 70 (d) 140



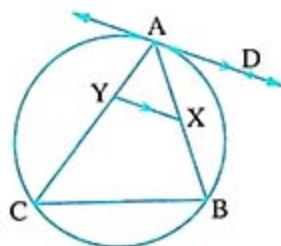
[b] In the opposite figure :

ABC triangle is drawn in the circle

, if $\overrightarrow{AD}$ is a tangent to the circle at A

, $X \in \overline{AB}$, $Y \in \overline{AC}$, $\overline{AD} \parallel \overline{XY}$

Prove that : XYCB is a cyclic quadrilateral.



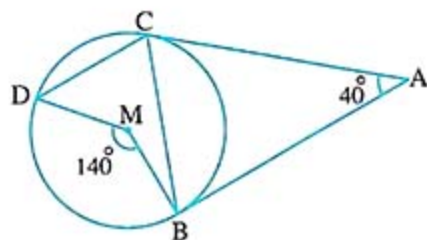
Fourth Question :

[a] In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangents to the circle M

, $m(\angle A) = 40^\circ$, $m(\angle BMD) = 140^\circ$

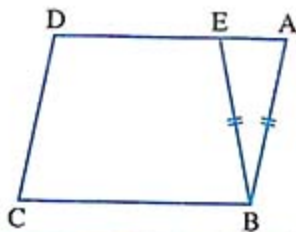
Prove that : $\overline{AB} \parallel \overline{CD}$



[b] In the opposite figure :

ABCD is parallelogram , $BA = BE$

Prove that : The figure BEDC is a cyclic quadrilateral.



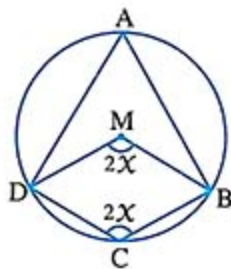
Fifth Question :

[a] In the opposite figure :

$\overline{AB}$, $\overline{AD}$ are two chords in circle M

, if $m(\angle BCD) = m(\angle BMD) = 2x$, $C \in (\widehat{BD})$

Find by proof : $m(\angle A)$ by degree.



[b] In the opposite figure :

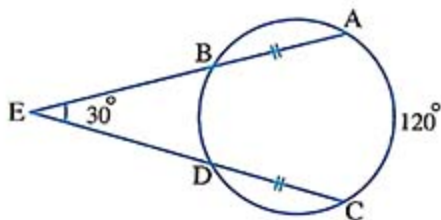
If $AB = CD$, $m(\angle E) = 30^\circ$

, $m(\widehat{AC}) = 120^\circ$

Find by proof :

(1) $m(\widehat{BD})$

(2) $m(\widehat{AB})$



El-Gharbia Governorate



Answer the following questions :

First Group :

► Choose the correct answer from those given :

- 1 If M , N are two touching internally circles of radii lengths 5 cm. and X cm. respectively where $X > 5$, $MN = 3$ cm. , then $X = \dots\dots\dots$ cm.
 (a) 5 (b) 8 (c) 2 (d) 3
- 2 ABC is an isosceles triangle in which $AB = AC$, $m(\angle A) = 80^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 80 (b) 50 (c) 40 (d) 20
- 3 The chord of length 6 cm. in a circle of diameter length 10 cm. is at distance $\dots\dots\dots$ cm. from its center.
 (a) 3 (b) 5 (c) 6 (d) 4
- 4 The diagonal length of the square whose perimeter is 16 cm. equals $\dots\dots\dots$ cm.
 (a) 4 (b) 16 (c) $4\sqrt{2}$ (d) $16\sqrt{2}$

- 5 If $AB = 6$ cm. , then the circumference of the smallest circle passing through the two points A and B equals cm.
 (a) 8π (b) 6π (c) 12π (d) 36π
- 6 If ABCD is a cyclic quadrilateral , $m(\angle B) = \frac{1}{4} m(\angle D)$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 36 (b) 45 (c) 72 (d) 144
- 7 A circle M of diameter length 8 cm. , if A is a point in its plane and $MA = 8$ cm. , then A lies the circle.
 (a) inside (b) on (c) outside (d) in the center of
- 8 An arc in a circle , its length $= \frac{1}{3} \pi r$ cm. , then it is opposite to an inscribed angle of measure
 (a) 30 (b) 60 (c) 120 (d) 90
- 9 The inscribed angle which is drawn in a semicircle is
 (a) acute. (b) obtuse. (c) right. (d) straight.

Second Group :

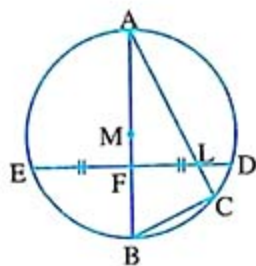
► Answer the following questions (showing the steps) :

10 In the opposite figure :

$\overline{AB}$ is a diameter in the circle M
 , F is midpoint of $\overline{DE}$, $\overline{AC} \cap \overline{DE} = \{L\}$

Prove that :

The figure LCBF is a cyclic quadrilateral.

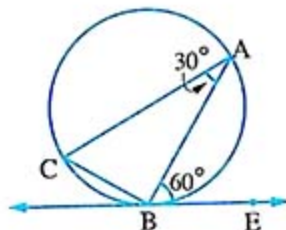


11 In the opposite figure :

$\overrightarrow{BE}$ is a tangent to the circle

, $m(\angle BAC) = 30^\circ$, $m(\angle ABE) = 60^\circ$

Prove that : $\overline{AC}$ is a diameter to the circle.

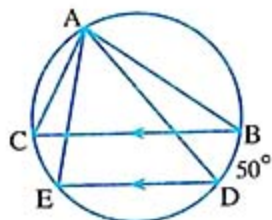


12 In the opposite figure :

ADE is a triangle inscribed in a circle , $\overline{DE} \parallel \overline{BC}$

, $m(\widehat{BD}) = 50^\circ$, $m(\angle EAC) = (3y - 5)^\circ$

Find the value of y

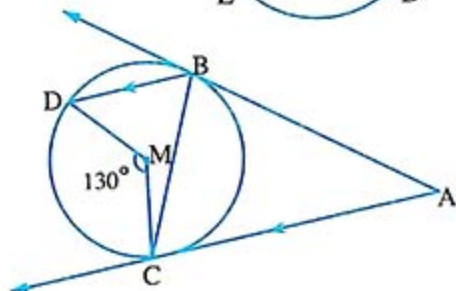


13 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangents to the circle M

, $\overline{AC} \parallel \overline{BD}$, $m(\angle CMD) = 130^\circ$

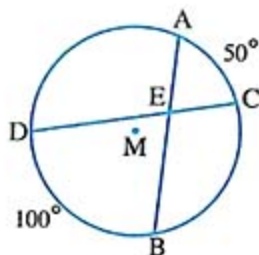
Prove that : $\overline{BC}$ bisects $\angle ABD$



14 In the opposite figure :

$\overline{AB}$ and $\overline{CD}$ are two chords in circle M
 $\overline{AB} \cap \overline{CD} = \{E\}$, $m(\widehat{AC}) = 50^\circ$
 $m(\widehat{BD}) = 100^\circ$

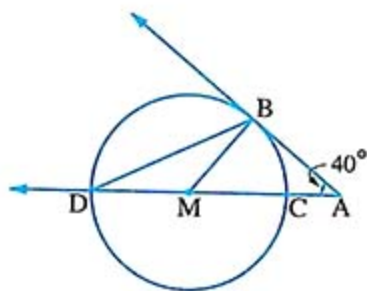
Find : $m(\angle AED)$



15 In the opposite figure :

$\overline{AB}$ is a tangent to the circle M at B
 $\overline{AM}$ intersects the circle at C and D
 respectively , $m(\angle A) = 40^\circ$

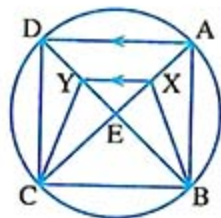
Find with proof : $m(\angle BDC)$



16 In the opposite figure :

The two diagonals of the cyclic quadrilateral ABCD
 intersect at E , $X \in \overline{AE}$, $Y \in \overline{DE}$, where $\overline{XY} \parallel \overline{AD}$

Prove that the figure : BXYC is a cyclic quadrilateral.



El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

First Question :

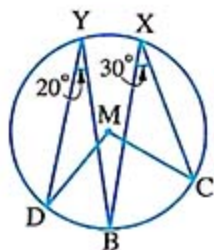
[a] Choose the correct answer :

- 1** The two tangents drawn to the circle at the two ends of a diameter in it are
 (a) parallel. (b) perpendicular. (c) intersecting. (d) equal in length.
- 2** It is possible to draw a circle passing through the vertices of
 (a) rhombus. (b) trapezium. (c) rectangle. (d) parallelogram.

3 In the opposite figure :

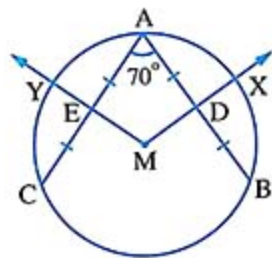
A circle of center M , $m(\angle X) = 30^\circ$, $m(\angle Y) = 20^\circ$
 , then $m(\angle CMD) = \dots\dots\dots^\circ$

- | | |
|--------|---------|
| (a) 40 | (b) 50 |
| (c) 60 | (d) 100 |



[b] In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two chords equal in length in circle M
 , D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$
 , draw $\overline{MD}$, $\overline{ME}$ are cutting the circle at X, Y respectively.



(1) Find : $m(\angle DME)$

(2) Prove that : $DX = EY$

Second Question :

[a] Choose the correct answer :

1 If M and N are two circles of radii lengths 8 cm. and 5 cm. respectively , if $MN = 13$ cm.
 , then the two circles are

(a) intersecting.

(b) touching externally.

(c) touching internally.

(d) distant.

2 If A, B are two points belong to the circle M , and $m(\widehat{AB}) = 45^\circ$
 , then $\tan(\angle AMB) = \dots\dots\dots$

(a) 1

(b) $\frac{\sqrt{2}}{2}$

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{3}}$

3 A circle its center is the origin point and its radius length is 5 length units. Which of the following points does not belong to the circle ?

(a) $(-5, 0)$

(b) $(0, 5)$

(c) $(5, 0)$

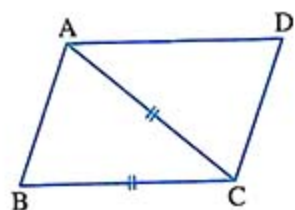
(d) $(5, 5)$

[b] In the opposite figure :

ABCD is a parallelogram in which $AC = BC$

Prove that :

$\overline{AB}$ is a tangent segment to the circle passing
 through the vertices of the triangle ACD



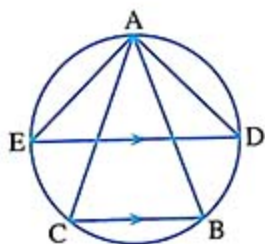
Third Question :

[a] In the opposite figure :

$\triangle ABC$ inscribed in the circle M

, $\overline{DE} \parallel \overline{BC}$

Prove that : $m(\angle DAC) = m(\angle EAB)$



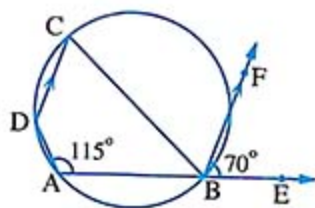
[b] In the opposite figure :

ABCD is a quadrilateral inscribed in circle

, $m(\angle A) = 115^\circ$, $E \in \overrightarrow{AB}$, $\overrightarrow{BF} \parallel \overrightarrow{DC}$

, if $m(\angle EBF) = 70^\circ$

Find by proof : $m(\angle D)$



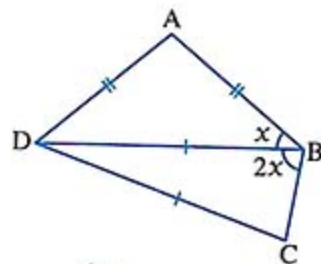
Fourth Question :

[a] In the opposite figure :

$AB = AD$, $DB = DC$

, $m(\angle ABD) = x^\circ$, $m(\angle DBC) = (2x)^\circ$

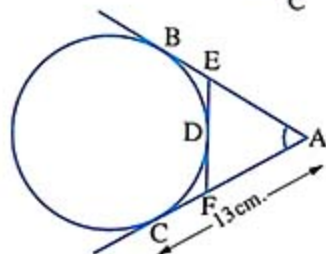
Prove that : ABCD is cyclic quadrilateral.



[b] In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangent segment to the circle at B, C respectively, $\overline{EF}$ is tangent segment to the circle at D, if $AC = 13$ cm.

Calculate the perimeter of $\triangle AEF$



Fifth Question :

[a] Choose the correct answer :

1 A circle M of radius length 7 cm. , A is a point outside the circle , then $MA \in \dots\dots\dots$

(a) $\{7\}$

(b) $]0, 7]$

(c) $]7, \infty[$

(d) $]14, \infty[$

2 In the opposite figure :

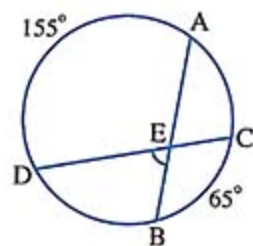
$\overline{AB}$, $\overline{CD}$ are two chords intersecting at point E, if $m(\widehat{BC}) = 65^\circ$, $m(\widehat{AD}) = 155^\circ$, then $m(\angle BED) = \dots\dots\dots^\circ$

(a) 40

(b) 50

(c) 70

(d) 110



3 If $AB = 6$ cm. , then the circumference of the smallest circle passing through the two points A, B is $\dots\dots\dots$ cm.

(a) 3π

(b) 6π

(c) 9π

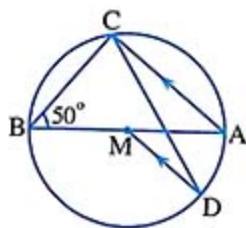
(d) 12π

[b] In the opposite figure :

$\overline{AB}$ is a diameter in circle M

, $\overline{AC} \parallel \overline{DM}$, $m(\angle B) = 50^\circ$

Find by proof : $m(\angle ACD)$



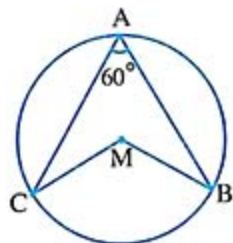


Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 ABCD is a parallelogram , $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots\dots\dots$
(a) 70° (b) 50° (c) 180° (d) 110°
- 2 M and N are two circles touching internally , the length of their radii are 4 cm. and 9 cm. , then $MN = \dots\dots\dots$ cm.
(a) 4 (b) 5 (c) 9 (d) 13
- 3 ABCD is a cyclic quadrilateral where $m(\angle A) = 2 m(\angle C)$, then $m(\angle A) = \dots\dots\dots$
(a) 120° (b) 90° (c) 60° (d) 30°
- 4 If $AB = 14$ cm. , then the area of the smallest circle passes through the two points A and B equal $\dots\dots\dots$ cm^2 .
(a) 14π (b) 28π (c) 49π (d) 196π
- 5 If the area of a square is 25 cm^2 , then it's perimeter = $\dots\dots\dots$ cm.
(a) 5 (b) 10 (c) 20 (d) 25
- 6 If L is a tangent to a circle whose diameter length is 4 cm. , then L is at a distance of $\dots\dots\dots$ cm. from its center.
(a) 2 (b) 4 (c) 8 (d) 10
- 7 The measure of the arc which represents half the measure of the circle equals $\dots\dots\dots$
(a) 360° (b) 180° (c) 120° (d) 90°
- 8 In a circle M , $m(\angle A) = 60^\circ$, then $m(\angle BMC) = \dots\dots\dots$
(a) 30° (b) 45°
(c) 60° (d) 120°
- 9 A chord of length 8 cm. in a circle of radius 5 cm. , then the chord is at $\dots\dots\dots$ cm. from the center of the circle.
(a) 8 (b) 5 (c) 4 (d) 3



Second Group :

► Answer the following questions :

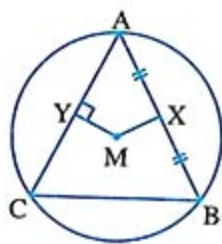
10 In the opposite figure :

M is a circumcircle of the triangle ABC

, where $m(\angle B) = m(\angle C)$

, X is a midpoint of $\overline{AB}$, $\overline{MY} \perp \overline{AC}$

Prove that : $MX = MY$



11 In the opposite figure :

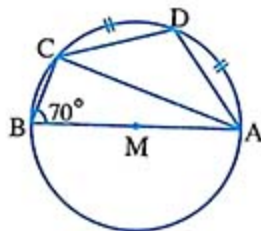
$\overline{AB}$ is a diameter of a circle M

, $m(\widehat{AD}) = m(\widehat{CD})$, $m(\angle ABC) = 70^\circ$

Find with proof :

(1) $m(\angle DCA)$

(2) $m(\angle CAB)$

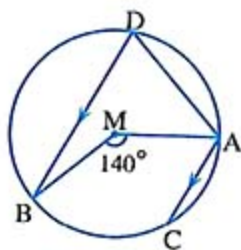


12 In the opposite figure :

M is a circle, $m(\angle AMB) = 140^\circ$

, $\overline{AC} \parallel \overline{DB}$

Find with proof : $m(\angle DAC)$

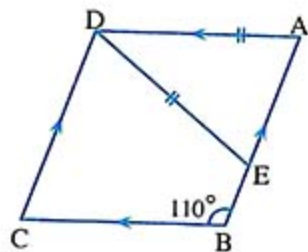


13 In the opposite figure :

ABCD is a parallelogram, $m(\angle B) = 110^\circ$

, $E \in \overline{AB}$ where $AD = DE$

Prove that : EBCD is a cyclic quadrilateral.



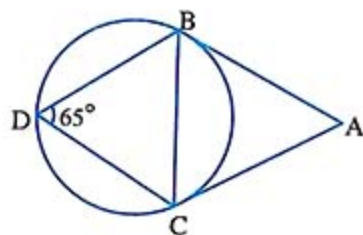
14 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangents

to the circle at B and C

, $m(\angle BDC) = 65^\circ$

Find with proof : $m(\angle BAC)$



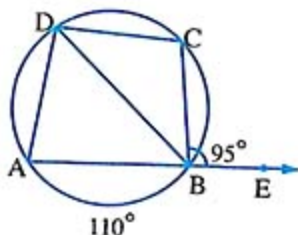
15 In the opposite figure :

$E \in \overline{AB}$, $E \notin \overline{AB}$

, $m(\widehat{AB}) = 110^\circ$

, $m(\angle CBE) = 95^\circ$

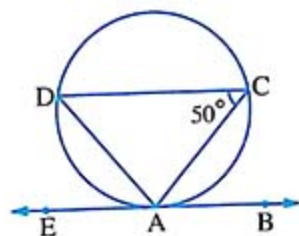
Find with proof : $m(\angle BDC)$



16 In the opposite figure :

$\overleftrightarrow{BE}$ is a tangent of a circumcircle of a triangle ACD , $m(\angle C) = 50^\circ$

Find with proof : $m(\angle BAD)$



10

Suez Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

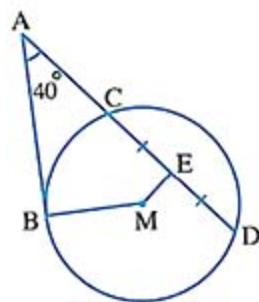
- 1** The circumference of the circle whose radius length is 3 cm. equals cm.
 (a) 3π (b) 4π (c) 5π (d) 6π

- 2** The area of the rectangle whose dimensions are 4 cm. and 6 cm. equals
 (a) 10 (b) 20 (c) 24 (d) 48

3 In the opposite figure :

$\overleftrightarrow{CB}$ is a tangent of the circle touches it at B
 , D is midpoint of $\overline{HA}$, $m(\angle ACB) = 40^\circ$
 , then $m(\angle BMD) = \dots\dots\dots^\circ$

- (a) 140 (b) 50
 (c) 90 (d) 80



- 4** M and N are two circles touching externally their radii length are 7 cm. , 3 cm.
 , then $MN = \dots\dots\dots$ cm.
 (a) 4 (b) 12 (c) 6 (d) 10

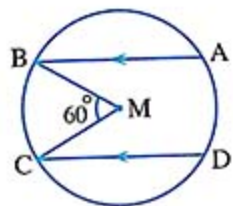
- 5** The center of the circles passing through the two points A and B lie on
 (a) the axis of symmetry of $\overline{AB}$ (b) $\overline{AB}$
 (c) the perpendicular $\overline{AB}$ (d) the midpoint of $\overline{AB}$

- 6** The longest chord of a circle is called
 (a) straight. (b) diameter. (c) tangent. (d) radius.

7 In the opposite figure :

M is a circle , $\overline{AB} \parallel \overline{DC}$, $m(\angle BMC) = 60^\circ$
 , then $m(\widehat{AD}) = \dots\dots\dots^\circ$

- (a) 30 (b) 40
 (c) 60 (d) 120



- 8 If ABCD is a cyclic quadrilateral in which $m(\angle A) = 50^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$

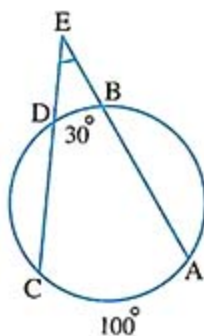
(a) 35 (b) 50 (c) 100 (d) 130

- 9 In the opposite figure :

If $m(\widehat{AC}) = 100^\circ$, $m(\widehat{BD}) = 30^\circ$

, then $m(\angle E) = \dots\dots\dots^\circ$

(a) 30 (b) 35
(c) 70 (d) 100



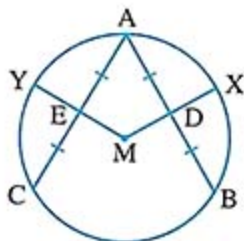
Second Group :

- Answer the following :

- 10 In the opposite figure :

In circle M, $AB = AC$, D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively

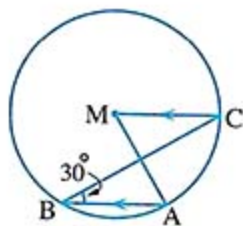
Prove that : $XD = YE$



- 11 In the opposite figure :

In a circle M, $\overline{AB}$ is chord, $\overline{MC} \parallel \overline{BA}$, $m(\angle B) = 30^\circ$

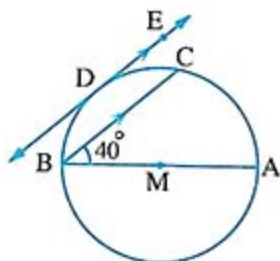
Find : $m(\angle A)$



- 12 In the opposite figure :

$\overline{AB}$ is a diameter in the circle M, $\overline{DH}$ is a tangent touches it at D, $\overline{CB} \parallel \overline{HD}$, $m(\angle B) = 40^\circ$

Find : $m(\widehat{CD})$

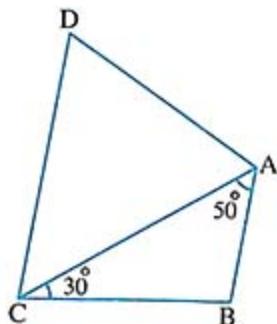


- 13 In the opposite figure :

ABCD is a cyclic quadrilateral

, $m(\angle BAC) = 50^\circ$, $m(\angle BCA) = 30^\circ$

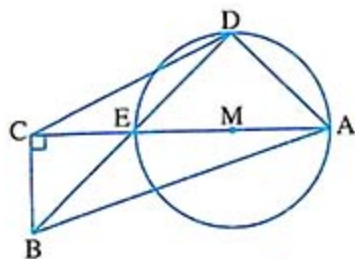
Find : $m(\angle D)$



14 In the opposite figure :

$\overline{AE}$ is a diameter in the circle M , $C \in \overline{AE}$
 $\overline{AC} \perp \overline{CB}$ and $\overline{CB} \cap \overline{DE} = \{E\}$

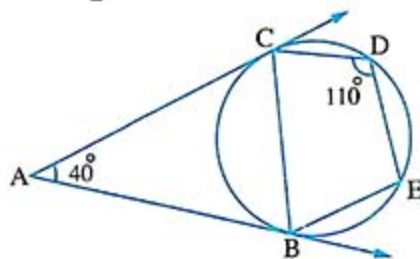
Prove that : $ABCD$ is a cyclic quadrilateral.



15 In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangents to the circle at B , C
 $m(\angle A) = 40^\circ$, $m(\angle CDE) = 110^\circ$

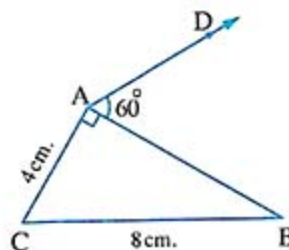
Prove that : (1) $\overline{BC}$ is bisect of $\angle ABE$
 (2) $\overline{BE} \parallel \overline{AC}$



16 In the opposite figure :

ABC is triangle right at A
 $AC = 4$ cm., $CB = 8$ cm.

Prove that : $\overline{AD}$ is a tangent to the circle passing through the vertices of $\triangle ABC$



Damietta Governorate



Answer the following questions :

First Question :

[a] Choose the correct answer from the given choices :

1 The area of the square whose side length is 3 cm. = cm^2

(a) 9

(b) 12

(c) 16

(d) 18

2 In the opposite figure :

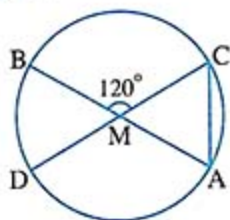
In the circle M , $m(\angle ACM) = \dots\dots\dots^\circ$

(a) 50

(b) 60

(c) 80

(d) 100



3 The radius length of the smallest circle which passes through the two points A and B where $AB = 6$ cm. is cm.

(a) 1

(b) 2

(c) 3

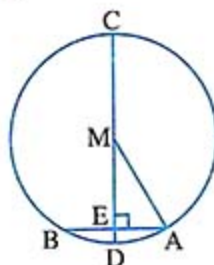
(d) 4

[b] In the opposite figure :

If $\overline{AB}$ is a chord in circle M

$AB = 10$ cm., $m(\angle AMD) = 30^\circ$

Find the length of : $\overline{CD}$



Second Question :

[a] Choose the correct answer from the given choices :

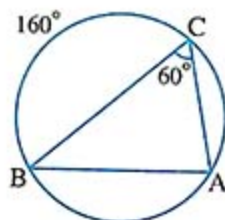
- 1 ABC is a triangle where $AB = AC$, if $m(\angle A) = 80^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$

(a) 100 (b) 80 (c) 50 (d) 25

2 In the opposite figure :

$m(\angle ABC) = \dots\dots\dots^\circ$

(a) 40 (b) 50
(c) 60 (d) 70



- 3 If the circle $M \cap$ the circle $N = \{A, B\}$, then the two circles M and N are

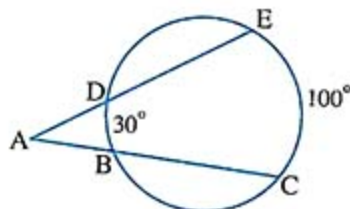
(a) distant. (b) concentric. (c) touchigexternally. (d) intersecting.

[b] In the opposite figure :

$\overrightarrow{CA} \cap \overrightarrow{ED} = \{A\}$, $m(\widehat{DB}) = 30^\circ$

, $m(\widehat{EC}) = 100^\circ$

Find by proof : $m(\angle EAC)$



Third Question :

[a] Choose the correct answer from the given choices :

- 1 The inscribed angle which is drawn in a quarter circle is angle.

(a) acute (b) right (c) obtuse (d) straight

- 2 If the straight line is a tangent to the circle whose diameter length is 8 cm. , then the straight line at a distance of cm. from its center.

(a) 3 (b) 4 (c) 6 (d) 8

- 3 ABCD is a cyclic quadrilateral in which $m(\angle A) = 3 m(\angle C)$, then $m(\angle A) = \dots\dots\dots^\circ$

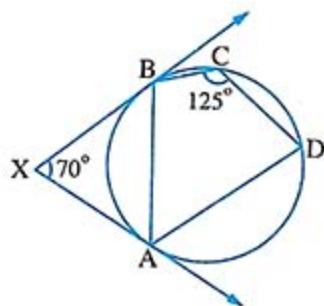
(a) 45 (b) 90 (c) 120 (d) 135

[b] In the opposite figure :

$\overrightarrow{XA}$ and $\overrightarrow{XB}$ are two tangent to the circle at A and B

, $m(\angle AXB) = 70^\circ$, $m(\angle DCB) = 125^\circ$

Prove that : $\overrightarrow{AB}$ bisects $\angle (DAX)$



Fourth Question :

[a] In the opposite figure :

$$\overline{AB} \parallel \overline{CD}, \overline{AD} \cap \overline{BC} = \{E\}$$

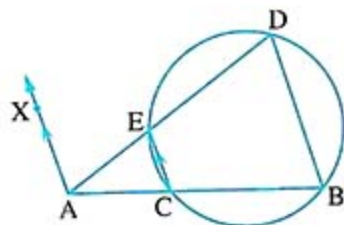
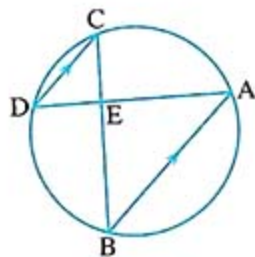
Prove that :

The triangle AEB is an isosceles triangle.

[b] In the opposite figure :

$$\overline{DE} \cap \overline{BC} = \{A\}, \overline{AX} \parallel \overline{CE}$$

Prove that : $\overline{AX}$ is a tangent to the circumcircle of $\triangle ABD$

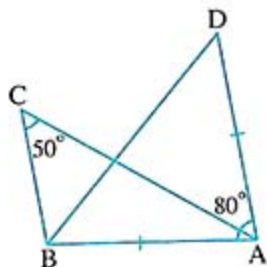


Fifth Question :

[a] In the opposite figure :

$$AB = AD, m(\angle A) = 80^\circ, m(\angle C) = 50^\circ$$

Prove that : The points A, B, C and D lie on one circle.

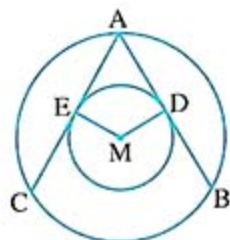


[b] In the opposite figure :

Two concentric circles at M, AB and AC are two tangents to the smallest circle at D and E respectively. Prove that :

(1) ADME is a cyclic quadrilateral.

$$(2) m(\widehat{DE}) + \frac{1}{2} m(\widehat{BC}) = 180^\circ$$



12

Kafr El-Sheikh Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

1 The diagonal length of the square whose area is 50 cm^2 equal cm.

(a) 10

(b) $5\sqrt{2}$

(c) $10\sqrt{2}$

(d) 5

2 In $\triangle ABC$, if $AB > AC$, then $m(\angle B) \dots\dots\dots m(\angle C)$

- (a) $\geq$ (b) $<$ (c) $=$ (d) $>$

3 The radius length of the smallest circle which passes through the two points A and B equal

- (a) AB (b) $2AB$ (c) $\frac{1}{2}AB$ (d) $\frac{2}{3}AB$

4 The center of any circle inscribed in a triangle is the intersection of

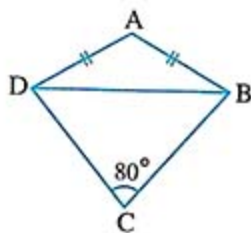
- (a) its median. (b) its altitudes.
(c) its interior angles bisectors. (d) its sides.

5 In the opposite figure :

ABCD is a cyclic quadrilateral, $m(\angle C) = 80^\circ$

, $AB = AD$, then $m(\angle ADB) = \dots\dots\dots^\circ$

- (a) 50 (b) 40
(c) 60 (d) 30



6 The ratio between the measure of the central angle and the measure of the inscribed angle subtended by the same arc is

- (a) 1 : 2 (b) 6 : 3 (c) 1 : 1 (d) 1 : 3

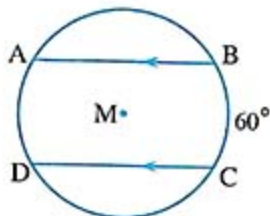
7 In the opposite figure :

M is a circle of radius length 6 cm.

, $m(\widehat{BC}) = 60^\circ$, $\overline{AB} \parallel \overline{DC}$

, then the length of $(\widehat{AD}) = \dots\dots\dots$ cm.

- (a) π (b) 2π
(c) 22 (d) 7



8 If M and N are two circles, their diameters are equal in length, $MN = 3r$ (r is the radius of the circle M), then M and N are

- (a) distant. (b) one is inside the other.
(c) intersecting. (d) touching externally.

9 If M is a circle, its diameter length is 12 cm., $\overrightarrow{MA} \perp L$ where $A \in L$, the straight line L is tangent to the circle M and $AM = 2x - 4$, then $x = \dots\dots\dots$

- (a) 8 (b) 6 (c) 4 (d) 5

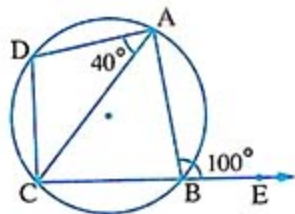
Second Group :

► Answer the following questions :

10 In the opposite figure :

$$m(\angle ABE) = 100^\circ, m(\angle CAD) = 40^\circ$$

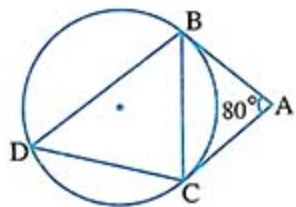
Prove that : $m(\widehat{CD}) = m(\widehat{AD})$



11 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangents to the circle
 $m(\angle BAC) = 80^\circ$

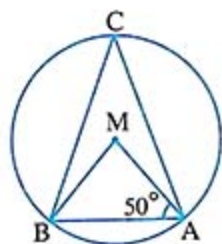
Find by proof : $m(\angle BDC)$



12 In the opposite figure :

$$m(\angle MAB) = 50^\circ$$

Find by proof : $m(\angle ACB)$

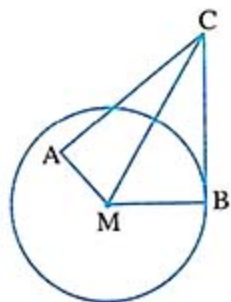


13 In the opposite figure :

$\overline{BC}$ is a tangent in circle M at B
 $\overline{MB}$ is a radius, $AM = 6$ cm.
 $CM = 10$ cm. and $AC = 8$ cm.

Prove that :

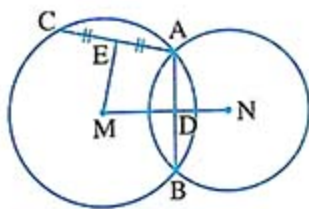
The figure AMBC is a cyclic quadrilateral.



14 In the opposite figure :

M and N are two intersecting circles at A and B
 E is the midpoint of $\overline{AC}$, $AB = AC$

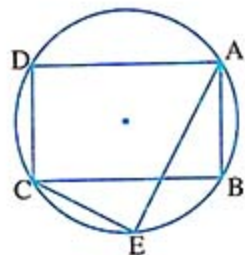
Prove that : $MD = ME$



15 In the opposite figure :

ABCD is a rectangle, $AE = BC$

Prove that : $CD = CE$



16 ABC is a triangle inscribed in a circle, $\overline{AD}$ is a tangent to the circle at A
 $X \in \overline{AB}$, $Y \in \overline{AC}$, where $\overline{XY} \parallel \overline{BC}$

Prove that : $\overline{AD}$ is a tangent to the circle passing through the points A, X and Y



Answer the following questions :

First Group :

► Choose the correct answer :

1 In the opposite figure :

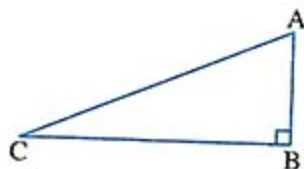
In $\triangle ABC$ $m(\angle B) = 90^\circ$, $AC = 13$ cm., $AB = 5$ cm.,
then area of $\triangle ABC = \dots\dots\dots \text{cm}^2$

(a) 65

(b) 32.5

(c) 60

(d) 30



2 The angle whose measure 75° supplements an angle of measure $\dots\dots\dots^\circ$

(a) 105

(b) 180

(c) 15

(d) 90

3 A circle M whose radius 5 cm., A is a point in the plane of circle M, where $A \notin$ surface of circle M. If $MA = 2x - 3$, then $x \in \dots\dots\dots$

(a) $]0, 4]$

(b) $[4, \infty[$

(c) $]4, \infty[$

(d) $]0, 4[$

4 Two circles M, N their radii 8 cm., 5 cm. respectively, is surface of circle M $\cap$ surface of circle N = $\{A\}$, then $MN = \dots\dots\dots$ cm.

(a) 3

(b) 13

(c) 7

(d) 15

5 In the opposite figure :

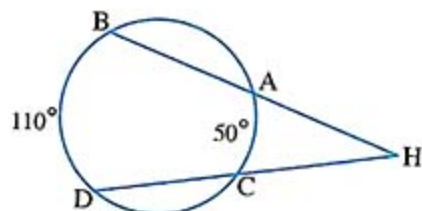
$m(\widehat{AC}) = 50^\circ$, $m(\widehat{BD}) = 110^\circ$
then $m(\angle H) = \dots\dots\dots^\circ$

(a) 60

(b) 50

(c) 40

(d) 30



6 The number of circles passing through three non collinear points is $\dots\dots\dots$

(a) zero.

(b) one.

(c) two.

(d) infinite.

7 In the opposite figure :

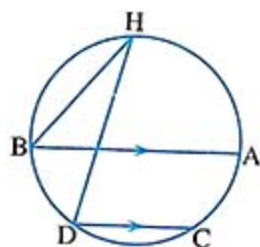
$\overline{AB} \parallel \overline{CD}$, $m(\widehat{AC}) = 50^\circ$
then $m(\angle DHB) = \dots\dots\dots^\circ$

(a) 25

(b) 50

(c) 100

(d) 90



8 In the opposite figure :

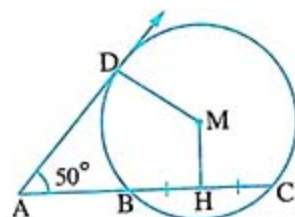
$\overrightarrow{AD}$ is a tangent to the circle M at D
 , H is midpoint of $\overline{BC}$, $m(\angle A) = 50^\circ$
 , then $m(\angle DMH) = \dots\dots\dots^\circ$

(a) 50

(b) 100

(c) 130

(d) 90



9 In the opposite figure :

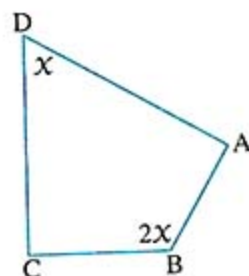
ABCD is a cyclic quadrilateral
 , then the value of $X = \dots\dots\dots^\circ$

(a) 120

(b) 100

(c) 60

(d) 50



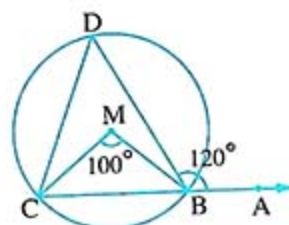
Second Group :

► Answer the following questions :

10 In the opposite figure :

A circle whose centre is M
 , $m(\angle BMC) = 100^\circ$, $m(\angle ABD) = 120^\circ$

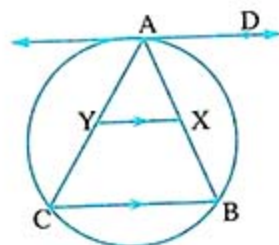
Find : $m(\angle DCB)$



11 In the opposite figure :

ABC is a triangle inscribed in a circle , $\overrightarrow{AD}$ is a tangent
 to the circle at A , $\overline{XY} \parallel \overline{BC}$

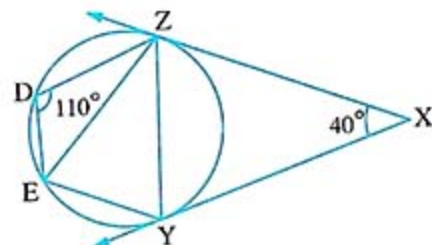
Prove that : $\overrightarrow{AD}$ is a tangent to the circle passing
 through the points A , X and Y



12 In the opposite figure :

$\overline{XY}$, $\overline{XZ}$ are two tangents to the circle at Y , Z
 , where $m(\angle X) = 40^\circ$, $m(\angle D) = 110^\circ$

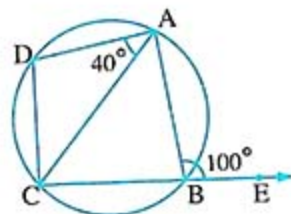
Prove that : $ZY = ZE$



13 In the opposite figure :

$m(\angle ABE) = 100^\circ$, $m(\angle CAD) = 40^\circ$

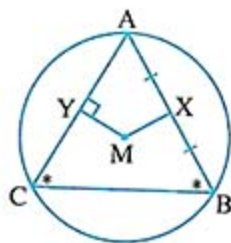
Prove that : $AD = DC$



14 In the opposite figure :

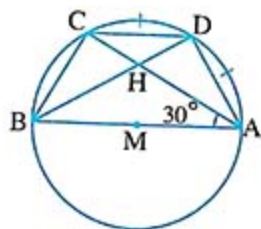
ABC is a triangle inscribed in a circle M
 , where $m(\angle B) = m(\angle C)$
 , X is midpoint $\overline{AB}$, $\overline{MY} \perp \overline{AC}$

Prove that : $MX = MY$



15 In the opposite figure :

$\overline{AB}$ is diameter in the circle M
 , D is midpoint of $(\widehat{AC})$, $m(\angle CAB) = 30^\circ$
Find : $m(\angle DBA)$, $m(\angle CAD)$

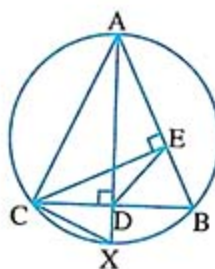


16 In the opposite figure :

$\overline{CE} \perp \overline{AB}$, $\overline{AD} \perp \overline{BC}$

Prove that :

- (1) AEDC is a cyclic quadrilateral.
- (2) $\overline{BC}$ bisects $\angle ECX$



El-Fayoum Governorate



Answer the following questions :

First Question :

[a] Choose the correct answer from those given :

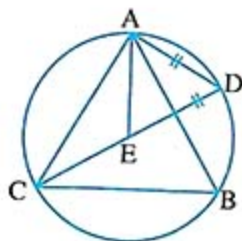
- 1 XYZ is a right-angled triangle at Y , then the center of the circumcircle of the triangle in the midpoint of
 (a) $\overline{XY}$ (b) $\overline{YZ}$ (c) $\overline{XZ}$ (d) the triangle.
- 2 An isosceles triangle , the length of its sides are 3 cm. , X cm. and 7 cm.
 , then $X =$ cm.
 (a) 3 (b) 4 (c) 5 (d) 7
- 3 M and N are two circles of radii lengths 9 cm. and 4 cm. respectively , $MN = 13$ cm.
 , then the two circles are
 (a) touching externally. (b) touching internally.
 (c) intersecting. (d) distant.

[b] In the opposite figure :

ΔABC is an equilateral triangle , $AD = DE$

Prove that :

ΔADE is an equilateral triangle.



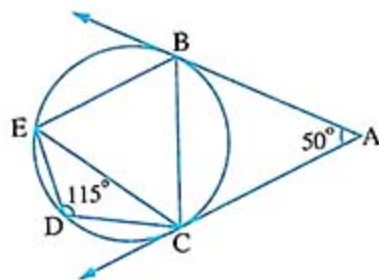
Second Question :

[a] In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangents to the circle at B and C
 $m(\angle A) = 50^\circ$, $m(\angle CDE) = 115^\circ$

Prove that :

- (1) $\overline{BC}$ bisects $\angle ABE$ (2) $CB = CE$ (3) $\overline{AC} \parallel \overline{BE}$

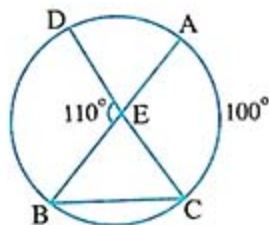


[b] In the opposite figure :

$$m(\widehat{DB}) = 110^\circ$$

$$, m(\widehat{AC}) = 100^\circ$$

Find : $m(\angle DCB)$



Third Question :

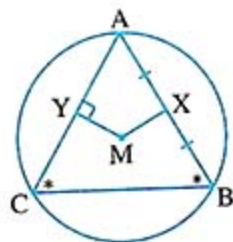
[a] Choose the correct answer from those given :

- 1 A circle M with diameter length 10 cm. , $\overline{AB}$ is a chord in the circle M with length 8 cm.
 , then the distance between the chord $\overline{AB}$ and the center of the circle is
- (a) 3 (b) 4 (c) 5 (d) 8
- 2 ABCD is a cyclic quadrilateral , in which $m(\angle A) = 3 m(\angle C)$, then $m(\angle A) = \dots\dots\dots$
- (a) 45° (b) 60° (c) 120° (d) 135°
- 3 The inscribed angle which is drawn in a quarter of the circle is
- (a) acute. (b) right. (c) obtuse. (d) straight.

[b] In the opposite figure :

The triangle ABC is an inscribed triangle inside a circle M
 $m(\angle B) = m(\angle C)$, X is midpoint of $\overline{AB}$, $\overline{MY} \perp \overline{AC}$

Prove that : $MX = MY$



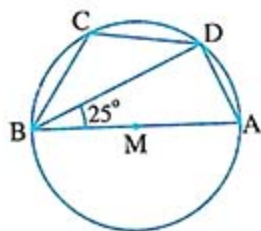
Fourth Question :

[a] In the opposite figure :

$\overline{AB}$ is diameter in the circle M

$$, m(\angle DBA) = 25^\circ$$

Find : $m(\angle C)$



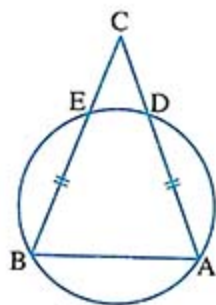
[b] In the opposite figure :

$\overline{AD}$ and $\overline{BE}$ are two equal chords

in length in the circle

$$, \overline{AD} \cap \overline{BE} = \{C\}$$

Prove that : $CD = CE$



Fifth Question :

[a] Choose the correct answer from those given :

1 The measure of the arc which represent $\frac{1}{3}$ of the measure of the circle =°

(a) 30

(b) 60

(c) 90

(d) 120

2 The area of square with side length 6 cm. the area of square with diagonal length is 8 cm.

(a) >

(b) <

(c) =

(d) ≤

3 The ration between the measure of the central angle and the measure of inscribed angle subtended by the same arc is

(a) 2 : 1

(b) 1 : 2

(c) 1 : 1

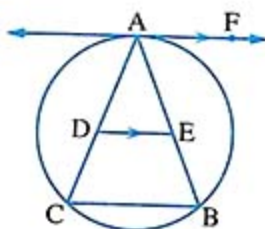
(d) 1 : 3

[b] In the opposite figure :

$\overline{AF}$ is a tangent to the circle at A , $\overline{AF} \parallel \overline{DE}$

Prove that :

The figure EBCD is a cyclic quadrilateral.



15

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

First Question :

► Choose the correct answer from those given :

1 Two parallel straight lines to third are

(a) perpendicular.

(b) parallel.

(c) intersecting.

(d) skew.

2 If M is a circle of radius length r cm. , then the length of the semicircle = cm.

(a) $2\pi r$

(b) $\frac{1}{4}\pi r$

(c) $\frac{1}{2}\pi r$

(d) πr

- 3 If M is a circle with diameter length = 6 cm. , L is a straight line where $A \in L$, $\overline{MA} \perp L$, if $MA = 3$ cm. , then the straight line L is a
- (a) tangent to the circle. (b) secant to the circle.
(c) outside the circle. (d) diameter of the circle.
- 4 The number of symmetry axes of a circle is
- (a) zero (b) 1
(c) 2 (d) an infinite number.
- 5 If $\overline{AB}$ is a line segment of length 4 cm. , then the radius length of the smallest circle which passes through the two points A and B equals cm.
- (a) 2 (b) 3 (c) 4 (d) 5
- 6 M and N are two intersecting circles , their radii lengths are 3 cm. , 5 cm. respectively , then $MN \in$
- (a) $]0, 2[$ (b) $]2, 8[$ (c) $]8, \infty[$ (d) $]3, \infty[$

Second Question :

[a] Choose the correct answer from those given :

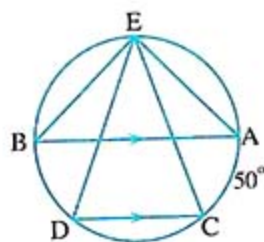
- 1 The measure of the inscribed angle equals the measure of the central angle subtended by the same arc.
- (a) twice (b) third (c) half (d) quarter
- 2 If $ABCD$ is a cyclic quadrilateral , $m(\angle A) : m(\angle C) = 1 : 2$, then $m(\angle A) =$
- (a) 30° (b) 60° (c) 90° (d) 120°

3 In the opposite figure :

$\overline{AB} \parallel \overline{CD}$, $m(\widehat{AC}) = 50^\circ$, $m(\angle BED) = (3x - 5)^\circ$

, then $x =$

- (a) 50° (b) 15°
(c) 10° (d) 45°



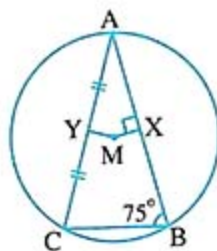
[b] In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two chords in the circle M

, $\overline{MX} \perp \overline{AB}$, Y is the midpoint of $\overline{AC}$

, $m(\angle ABC) = 75^\circ$, $MX = MY$

Find : $m(\angle BAC)$



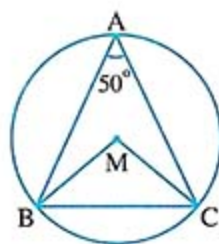
Third Question :

[a] In the opposite figure :

ABC is an inscribed triangle in circle M , $m(\angle A) = 50^\circ$

Find : (1) $m(\angle BMC)$

(2) $m(\angle MBC)$



[b] Find the measure of the arc which represents $\frac{3}{5}$ the measure of circle , then calculate the length of this arc , if the length of the radius is 7 cm. ($\pi = \frac{22}{7}$)

Fourth Question :

[a] In the opposite figure :

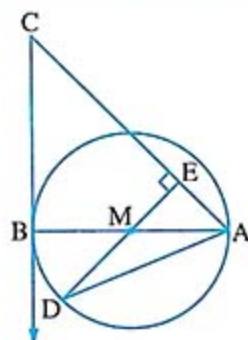
$\overline{AB}$ is a diameter in the circle M

, $\overline{CB}$ is a tangent to the circle at B

, $\overline{ME} \perp \overline{AC}$

Prove that : (1) EMBC is cyclic quadrilateral.

(2) $m(\angle C) = 2 m(\angle DAB)$



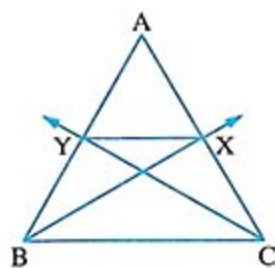
[b] In the opposite figure :

ABC is a triangle , $AB = AC$

, $\overline{BX}$ bisects $\angle ABC$ and intersects $\overline{AC}$ at X

, $\overline{CY}$ bisects $\angle ACB$ and intersects $\overline{AB}$ at Y

Prove that : BCXY is a cyclic quadrilateral.



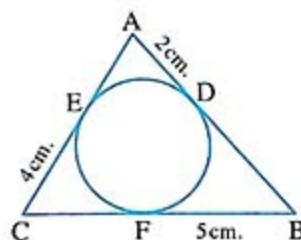
Fifth Question :

[a] In the opposite figure :

ΔABC touches the circle externally at D , F , E

where $AD = 2$ cm. , $BF = 5$ cm. , $CE = 4$ cm.

Find : The perimeter of ΔABC



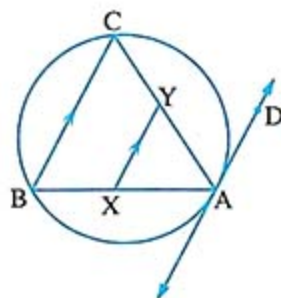
[b] In the opposite figure :

ABC is a triangle inscribed in a circle

, $\overline{AD}$ is a tangent to the circle at A , $X \in \overline{AB}$

, $Y \in \overline{AC}$, where $\overline{XY} \parallel \overline{BC}$

Prove that : $\overline{AD}$ is a tangent to the circle passing through the points A , X , Y





Answer the following questions : (Calculator is allowed)

First Question :

► Choose the correct answer from those given :

- 1 If M and N are two circles , their radii lengths are 3 cm. , 4 cm and $MN = 5$ cm. , then the two circles are
 (a) distant. (b) intersecting.
 (c) touching. (d) one is inside the other.
- 2 ABCD is a cyclic quadrilateral , $E \in \overline{BC}$, $m(\angle A) = 100^\circ$, then $m(\angle DCE) = \dots\dots\dots^\circ$
 (a) 80 (b) 180 (c) 100 (d) 90
- 3 ΔABC , if $(AB)^2 = (AC)^2 - (BC)^2$, then $\angle B$ is
 (a) obtuse. (b) acute. (c) straight. (d) right.
- 4 An arc of a circle of measure 108° and the radius of the circle equals 5 cm. , then the length of the arc equals cm.
 (a) 2π (b) 3π (c) 5π (d) 10π
- 5 A chord of length 8 cm. in a circle of radius 5 cm. , then the distance between the chord and the center of the circle is cm.
 (a) 3 (b) 4 (c) 5 (d) 10
- 6 If M is a circle of radius 7 cm. , L is a straight line in the same plane , $\overline{MA} \perp L$, where $A \in L$, $2MA - 5 = 9$, then L is to the circle.
 (a) tangent (b) secant (c) outside (d) diameter

Second Question :

[a] Choose the correct answer from those given :

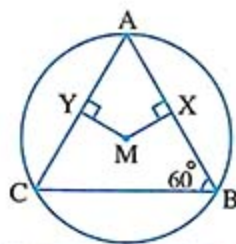
- 1 The number of circles passing through three non-collinear points is
 (a) zero (b) 1 (c) 2 (d) 3
- 2 Number of diagonals of a quadrilateral equals
 (a) 1 (b) 2 (c) 3 (d) 4
- 3 ABCD is a square inscribed in a circle , then $m(\widehat{AB}) = \dots\dots\dots^\circ$
 (a) 45 (b) 90 (c) 180 (d) 360

[b] In the opposite figure :

$$MX = MY, \overline{MX} \perp \overline{AB}, \overline{MY} \perp \overline{AC}$$

$$AB = 11 \text{ cm.}, m(\angle B) = 60^\circ$$

Find with proof : The perimeter of triangle ABC

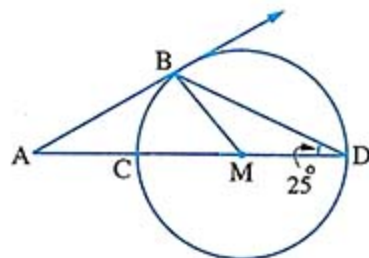


Third Question :

[a] In the opposite figure :

A is a point outside the circle M, $\overrightarrow{AB}$ is a tangent to the circle M at B, $\overrightarrow{AM}$ intersects the circle M at C and D respectively, $m(\angle BDC) = 25^\circ$

Find with proof : $m(\angle A)$

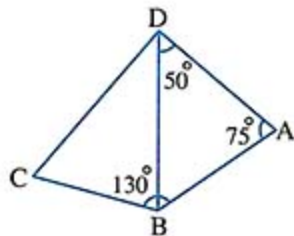


[b] In the opposite figure :

ABCD is a quadrilateral, in which $m(\angle ADB) = 50^\circ$, $m(\angle A) = 75^\circ$, $m(\angle ABC) = 130^\circ$

Prove that :

$\overline{BC}$ is a tangent to the circle passing through the points A, B and D



Fourth Question :

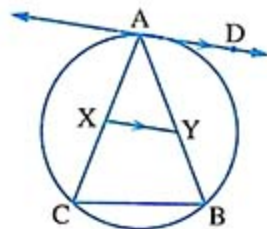
[a] In the opposite figure :

$\overrightarrow{AD}$ is a tangent to the circle at A

, $X \in \overline{AC}$, $Y \in \overline{AB}$

, where $\overline{XY} \parallel \overline{AD}$

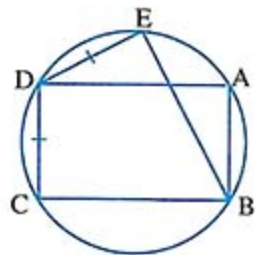
Prove that : XCBY is a cyclic quadrilateral.



[b] In the opposite figure :

ABCD is a rectangle inscribed in a circle, $CD = DE$

Prove that : $BE = AD$



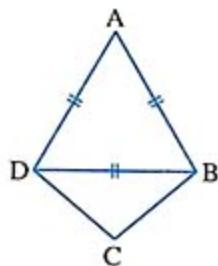
Fifth Question :

[a] In the opposite figure :

ABCD is a cyclic quadrilateral

, $\triangle ABD$ is an equilateral triangle.

Find with proof : $m(\angle C)$



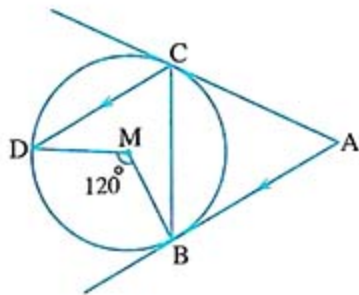
[b] In the opposite figure :

$\overline{AB}$, $\overline{AC}$ are two tangent segments to the circle M

, $\overline{AB} \parallel \overline{CD}$, $m(\angle BMD) = 120^\circ$

Find with proof : (1) $m(\angle BCD)$

(2) $m(\angle A)$



17

Souhag Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

- 1 The axis of symmetry of the common chord $\overline{AB}$ of two intersecting circles M and N is

(a) $\overline{MN}$ (b) $\overline{MA}$ (c) $\overline{MN}$ (d) $\overline{MB}$

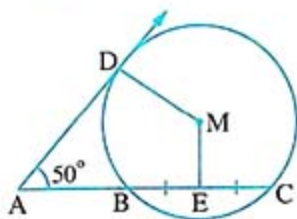
2 In the opposite figure :

$\overline{AD}$ is a tangent to the circle M

, $\overline{AC}$ intersect the circle at B and C, $m(\angle A) = 50^\circ$

and E is the midpoint of $\overline{BC}$, then $m(\angle DME) = \dots\dots\dots$

(a) 50° (b) 40° (c) 130° (d) 110°



- 3 M and N are two touching circles, their radii lengths are 2 cm. and 5 cm., then $MN \in \dots\dots\dots$

(a) $]3, 7[$ (b) $]7, \infty[$ (c) $]0, 3[$ (d) $\{3, 7\}$

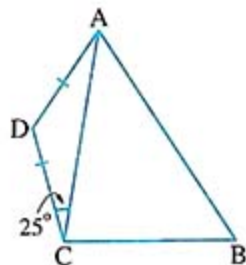
4 In the opposite figure :

If ABCD is a cyclic quadrilateral

, $m(\angle ACD) = 25^\circ$, $AD = DC$

, then $m(\angle B) = \dots\dots\dots$

(a) 130° (b) 65°
(c) 50° (d) 25°



- 5 A triangle has one axis of symmetry, the lengths of two sides in it are 8 cm. and 4 cm., then its perimeter = cm.

(a) 16 (b) 32 (c) 12 (d) 20

- 6 If the measure of the angle of tangency equals 70° , then the measure of the central angle subtended by the same arc equals

(a) 35° (b) 70° (c) 140° (d) 105°

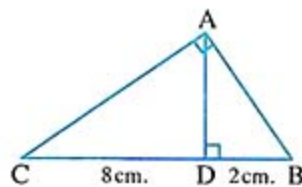
- 7 In the opposite figure :

ΔABC is right angled at A, $\overline{AD} \perp \overline{BC}$

, $BD = 2$ cm. and $DC = 8$ cm.

, then $AD = \dots\dots\dots$ cm.

(a) 4 (b) 16 (c) 8 (d) 2



- 8 The radius length of the smallest circle passing through the two points A and B, where $AB = 6$ cm. is cm.

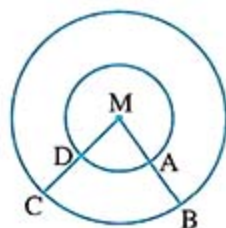
(a) 1 (b) 2 (c) 3 (d) 4

- 9 In the opposite figure :

Two concentric circles with center M

, $m(\widehat{BC}) = 80^\circ$, then $m(\widehat{AD}) = \dots\dots\dots$

(a) 20° (b) 40°
(c) 60° (d) 80°



Second Group :

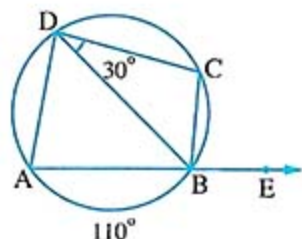
► Answer the following questions :

- 10 In the opposite figure :

$E \in \overline{AB}$, $E \notin \overline{AB}$, $m(\widehat{AB}) = 110^\circ$

and $m(\angle BDC) = 30^\circ$

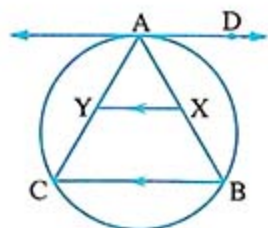
Find with proof : $m(\angle EBC)$



- 11 In the opposite figure :

ΔABC is inscribed in a circle, $\overleftrightarrow{AD}$ is a tangent to the circle at A, $X \in \overline{AB}$, $Y \in \overline{AC}$ and $\overline{XY} \parallel \overline{BC}$

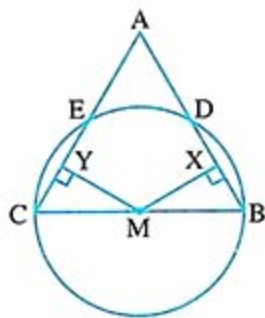
Prove that : $\overleftrightarrow{AD}$ is a tangent to the circle passing through the points A, X and Y



12 In the opposite figure :

$\triangle ABC$ in which $AB = AC$
 , a circle M of diameter $\overline{BC}$ is drawn
 , it intersects $\overline{AB}$ at D and $\overline{AC}$ at E
 , $\overline{MX} \perp \overline{BD}$ and $\overline{MY} \perp \overline{CE}$

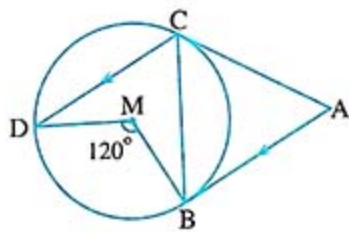
Prove that : $BD = CE$



13 In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangent segments to the circle M
 , $\overline{AB} \parallel \overline{CD}$, $m(\angle BMD) = 120^\circ$

Prove that : $\triangle ABC$ is equilateral.

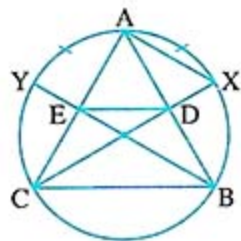


14 In the opposite figure :

$\triangle ABC$ is inscribed in a circle , $X \in \widehat{BC}$
 , $Y \in \widehat{AC}$, $m(\widehat{AX}) = m(\widehat{AY})$
 , $\overline{CX} \cap \overline{AB} = \{D\}$, $\overline{BY} \cap \overline{AC} = \{E\}$

Prove that : (1) $BCED$ is a cyclic quadrilateral.

(2) $m(\angle DEB) = m(\angle XAB)$



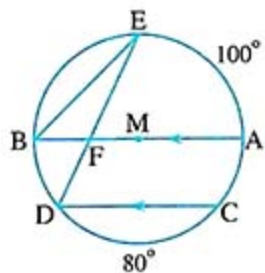
15 In the opposite figure :

$\overline{AB}$ is a diameter in the circle M
 , $\overline{AB} \parallel \overline{CD}$, $m(\widehat{CD}) = 80^\circ$ and $m(\widehat{AE}) = 100^\circ$

Find with proof :

(1) $m(\angle DEB)$

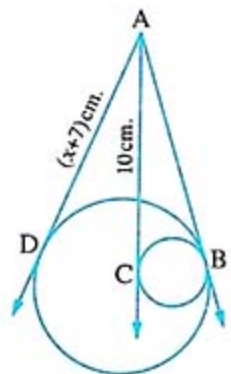
(2) $m(\angle AFE)$



16 In the opposite figure :

Two circles touching internally at the point B
 , $\overline{AB}$ is a common tangent , $\overline{AC}$ is a tangent to
 the smaller circle , $\overline{AD}$ is a tangent to the greater circle
 , if $AC = 10$ cm. and $AD = (X + 7)$ cm.

Find : The value of X



Answer the following questions : (Calculator is permitted)

First Question :

[a] Choose the correct answer from those given :

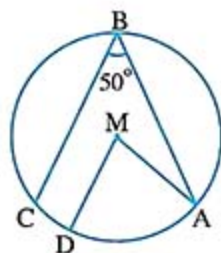
1 The number of symmetric axes of semicircle is

- (a) zero (b) 1
(c) 2 (d) an infinite number.

2 In the opposite figure :

$m(\angle AMD) \dots\dots\dots 100^\circ$

- (a) > (b) <
(c) = (d) $\geq$



3 The measure of an exterior of an equilateral triangle =

- (a) 60° (b) 80° (c) 90° (d) 120°

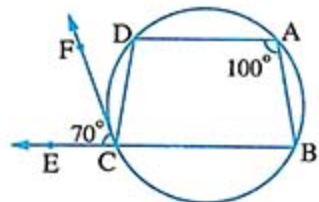
[b] In the opposite figure :

ABCD is a cyclic quadrilateral

, $m(\angle A) = 100^\circ$, $E \in \overrightarrow{BC}$

, $\overrightarrow{CF}$ is a tangent to the circle at C, $m(\angle ECF) = 70^\circ$

Find : $m(\angle DCF)$



Second Question :

[a] Choose the correct answer from those given :

1 If ABCD is a cyclic quadrilateral and $(\angle D)$ is right, then $(\angle B)$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

2 If $\triangle ABC$ is right-angled at B and $AB = 8$ cm. , $BC = 6$ cm. , then the length of the diameter of circumcircle of $\triangle ABC = \dots\dots\dots$ cm.

- (a) 10 (b) 8 (c) 6 (d) 5

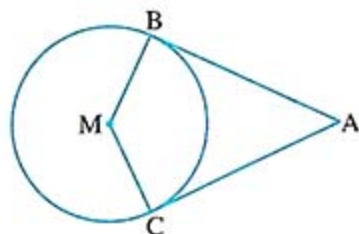
3 The inscribed angle drawn in a third of a circle is angle.

- (a) an acute (b) a right (c) an obtuse (d) a straight

[b] In the opposite figure :

$\overline{AB}$ and $\overline{AC}$ are two tangents to the circle M at B and C respectively.

Prove that : ABMC is cyclic quadrilateral.



Third Question :

[a] Choose the correct answer from those given :

1 A rhombus of side length 7 cm. , then its perimeter = cm.

(a) 14

(b) 28

(c) 49

(d) 70

2 If the surface of the circle $M \cap$ The surface of the circle $N = \{A\}$, then the two circles M and N are

(a) distant.

(b) intersecting.

(c) touching externally.

(d) touching internally.

3 In the opposite figure :

X is midpoint of $\overline{AB}$, $\overline{MY} \perp \overline{CD}$ and $YD = 7$ cm.

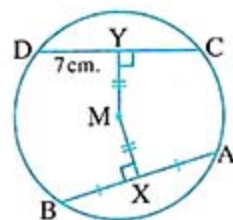
, then the length of $\overline{AB}$ = cm.

(a) 49

(b) 14

(c) 7

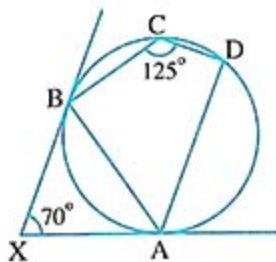
(d) 3.5



[b] In the opposite figure :

$\overline{XA}$ and $\overline{XB}$ are two tangents to the circle at A and B respectively , ABCD is a cyclic quadrilateral in which $m(\angle BCD) = 125^\circ$

Prove that : $\overline{AD} \parallel \overline{XB}$

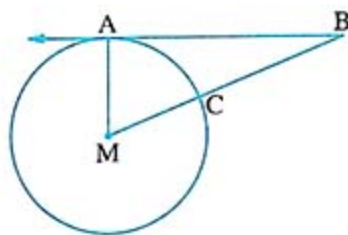


Fourth Question :

[a] In the opposite figure :

$\overline{AB}$ is a tangent to the circle M at A , $AB = 12$ cm. , the length of the diameter of the circle M is 10 cm.

Find : The length of $\overline{BC}$

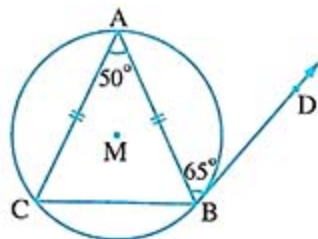


[b] In the opposite figure :

$\triangle ABC$ in which $AB = AC$ and the circle M passes through the vertices of $\triangle ABC$

, $m(\angle A) = 50^\circ$, $m(\angle ABD) = 65^\circ$

Prove that : $\overrightarrow{BD}$ is a tangent to the circle M



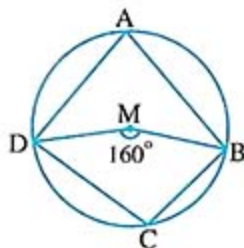
Fifth Question :

[a] In the opposite figure :

$ABCD$ is a cyclic quadrilateral

, $m(\angle BMD) = 160^\circ$

Find : $m(\angle C)$

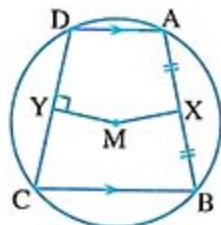


[b] In the opposite figure :

$ABCD$ is a quadrilateral drawn in the circle M

, $\overline{AD} \parallel \overline{BC}$, X is the midpoint of $\overline{AB}$, $\overline{MY} \perp \overline{CD}$

Prove that : $MX = MY$



19

Luxor Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

- 1 The point of concurrence of the medians of triangle divides each median in the ratio from the base.
 - (a) 1 : 3
 - (b) 4 : 6
 - (c) 2 : 1
 - (d) 1 : 2
- 2 If length of a diameter in circle = 10 cm. , then the distance between its center and tangent =
 - (a) 20 cm.
 - (b) 10 cm.
 - (c) 5 cm.
 - (d) 4 cm.
- 3 If surface of circle $M \cap$ surface of circle $N = \{A\}$ the radius length of one of them = 7 cm. , $MN = 12$ cm. , then the other radius length =
 - (a) 5 cm.
 - (b) 17 cm.
 - (c) 7 cm.
 - (d) 12 cm.
- 4 We can't draw a circle passing through the vertices of
 - (a) square.
 - (b) triangle.
 - (c) rectangle.
 - (d) rhombus.

5 The area of rhombus whose diagonal length are 10 cm. , 14 cm. = cm.

- (a) 70 (b) 35 (c) 140 (d) 105

6 ABCD is a cyclic quadrilateral $m(\angle A) : m(\angle C) = 2 : 3$, then $m(\angle A) =$

- (a) 108 (b) 72 (c) 80 (d) 100

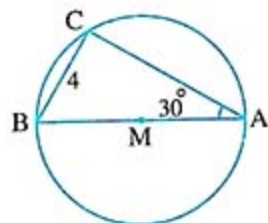
7 $\triangle ABC$ an equilateral triangle is inscribed inside a circle , then $m(\widehat{AB})$ minor =

- (a) 30 (b) 60 (c) 120 (d) 240

8 $\overline{AB}$ a diameter in circle M , $m(\angle BAC) = 30^\circ$

, $BC = 4$ cm. , $AB =$

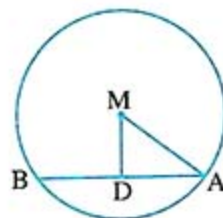
- (a) 8 cm. (b) 4 cm.
(c) 2 cm. (d) $4\sqrt{3}$



9 $\overline{AB}$ is a chord in circle M , $\overline{MD} \perp \overline{AB}$

, $MD = 3$ cm. , $r = 5$ cm. , then $\overline{AB} =$ cm.

- (a) 4 (b) 8
(c) 10 (d) 6



Second Group :

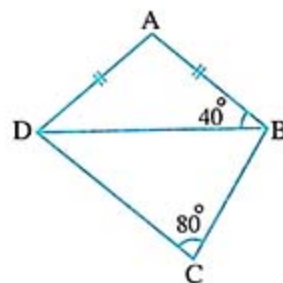
► Answer each of the following :

10 In the opposite figure :

$AB = AD$, $m(\angle ABD) = 40^\circ$

, $m(\angle C) = 80^\circ$

Prove that : ABCD is a cyclic quadrilateral.

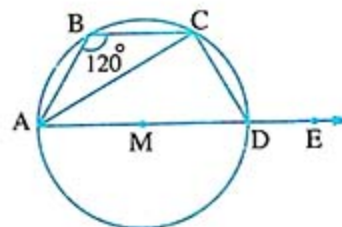


11 In the opposite figure :

$\overline{AD}$ is a diameter of a circle M

, $E \in \overrightarrow{AD}$, $m(\angle B) = 120^\circ$

Find : $m(\angle CDE)$ and $m(\angle CAD)$

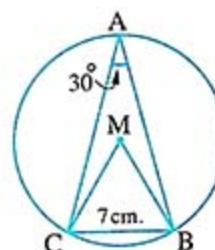


12 In the opposite figure :

Circle M , $BC = 7$ cm.

, $m(\angle A) = 30^\circ$

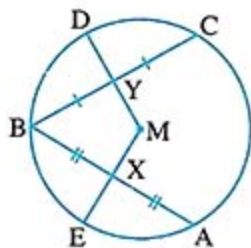
Find : The circumference of the circle M



13 In the opposite figure :

$\overline{AB}$, $\overline{BC}$ are two chord in a circle M
 , X is the midpoint of $\overline{AB}$, Y is the midpoint
 of $\overline{BC}$, if $EX = YD$

Prove that : $AB = BC$

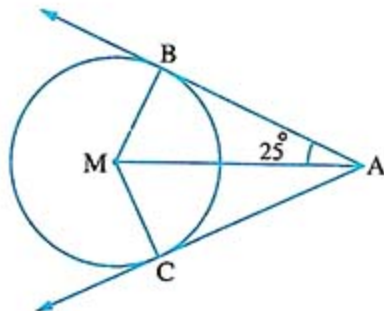


14 In the opposite figure :

$\overrightarrow{AB}$, $\overrightarrow{AC}$ are two tangents to circle M
 at B, C, $m(\angle BAM) = 25^\circ$

(1) Prove that : $\overrightarrow{MA}$ bisects $\angle BMC$

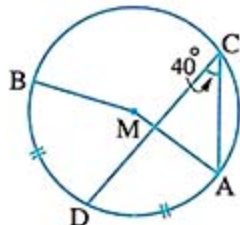
(2) Find : $m(\angle BMC)$



15 In the opposite figure :

M is a circle, D is midpoint of arc $\widehat{AB}$
 , $m(\angle ACD) = 40^\circ$

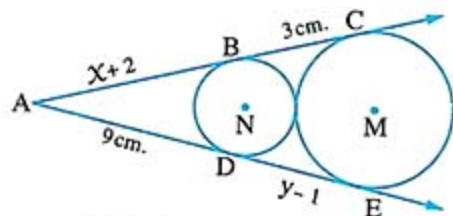
Find : $m(\angle AMB)$



16 In the opposite figure :

$\overrightarrow{AC}$, $\overrightarrow{AE}$ are tangents of two circles N, M

Find : X and y



20

South Sinai Governorate



Answer the following questions :

First Question :

[a] Choose the correct answer from the given ones :

1 In a right-angled triangle, the length of the side opposite to angle of measure 30° equals length of the hypotenuse.

(a) $\frac{1}{4}$

(b) $\frac{1}{3}$

(c) $\frac{1}{2}$

(d) $\frac{1}{6}$

2 In the same circle the measure of a central angle equal the measure of the inscribed angle subtended by the same arc.

(a) twice

(b) half

(c) equal

(d) third

- 3 M and N are two intersecting circles the lengths of their radii are 5 cm. and 7 cm.
 , then $MN \in \dots\dots\dots$

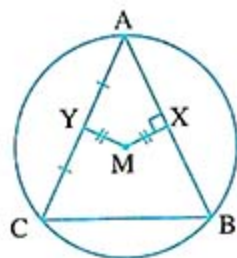
(a) $]5, 7[$ (b) $]2, 12[$ (c) $]5, 12[$ (d) $]2, 7[$

[b] In the opposite figure :

$\overline{MX} \perp \overline{AB}$, Y is a midpoint of $\overline{AC}$

where $MX = MY$

Prove that : $\triangle ABC$ is an isosceles triangle.



Second Question :

[a] Choose the correct answer from the given answers :

- 1 If a straight line L at distance 5 cm. from the center of the circle and its diameter length is 8 cm. , then it is of the circle.

(a) a secant (b) an axis of symmetry
 (c) outside (d) a tangent

- 2 ABCD is a cyclic quadrilateral where $m(\angle A) = 60^\circ$, then $m(\angle C) = \dots\dots\dots$

(a) 120° (b) 60° (c) 180° (d) 90°

- 3 The two tangents that drawn from the two ends of any diameter in a circle are

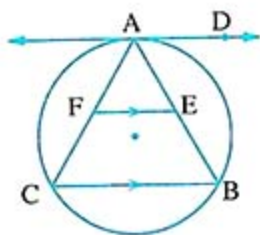
(a) equal in length. (b) intersecting. (c) parallel. (d) perpendicular.

[b] In the opposite figure :

ABC is a triangle drawn inside a circle

, $\overleftrightarrow{AD}$ is a tangent of this circle $\overline{EF} \parallel \overline{BC}$

Prove that : $\overleftrightarrow{AD}$ is a tangent to a circle passing through the vertices of the triangle AEF



Third Question :

[a] Choose the correct answer from the given answers :

- 1 A circle its circumference is 8π length unit , then the length of its diameter = length unit.

(a) 4 (b) 2 (c) 8 (d) 16

- 2 It is impossible to draw a circle passing through

(a) a rhombus. (b) a triangle. (c) a rectangle. (d) a square.

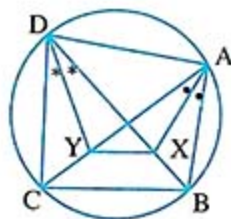
- 3 The measure of the angle of tangency the measure of an inscribed angle subtended by the same arc.

(a) half (b) twice (c) equals (d) three times

[b] In the opposite figure :

ABCD is a cyclic quadrilateral $\overrightarrow{AX}$ bisects $\angle BAC$, $\overrightarrow{DY}$ bisects $(\angle BDC)$

Prove that : AXYD is a cyclic quadrilateral.

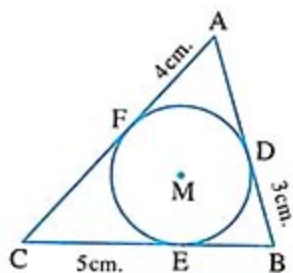


Fourth Question :

[a] In the opposite figure :

A circle M is drawn inside a triangle ABC it touches its sides at the points D, E and F, if $AF = 4$ cm., $BD = 3$ cm., $EC = 5$ cm.

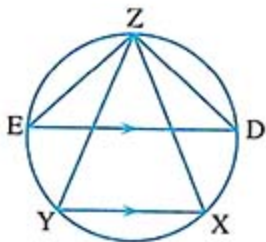
Find : The perimeter of a triangle ABC



[b] In the opposite figure :

$\overline{DE}$ and $\overline{XY}$ are two parallel chords in a circle and Z is a point on this circle.

Prove that : $m(\angle DZY) = m(\angle XZE)$

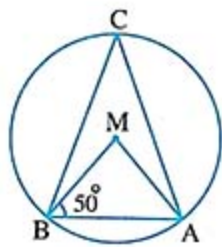


Fifth Question :

[a] In the opposite figure :

A circle with center M, $\overline{AB}$ is a chord, $m(\angle ABM) = 50^\circ$

Find by proof : $m(\angle ACB)$

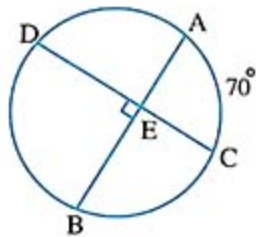


[b] In the opposite figure :

$\overline{AB}$ and $\overline{CD}$ are two intersecting chords in a circle at E

, if $m(\widehat{AC}) = 70^\circ$, $m(\angle DEB) = 90^\circ$

Find by proof : $m(\widehat{BD})$



Answers of school book examinations on algebra and probability

Model 1

1

- 1 b 2 a 3 d 4 c 5 b 6 a

2

[a] $\therefore 2x^2 - 5x + 1 = 0$

$\therefore a = 2, b = -5, c = 1$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{5 \pm \sqrt{17}}{4}$

$\therefore x = 2.3 \text{ or } x = 0.2$

$\therefore \text{The S.S.} = \{2.3, 0.2\}$

[b] $\therefore n(x) = \frac{x-3}{(x-3)(x-4)} - \frac{4}{x(x-4)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{3, 4, 0\}$

$\therefore n(x) = \frac{1}{x-4} - \frac{4}{x(x-4)} = \frac{x-4}{x(x-4)} = \frac{1}{x}$

3

[a] $\therefore x - y = 0 \quad \therefore x = y \quad (1)$

$\therefore x^2 + xy + y^2 = 27 \quad (2)$

Substituting from (1) in (2):

$\therefore y^2 + y^2 + y^2 = 27 \quad \therefore 3y^2 = 27$

$\therefore y^2 = 9 \quad \therefore y = 3 \text{ or } y = -3$

Substituting in (1): $\therefore x = 3 \text{ or } x = -3$

$\therefore \text{The S.S.} = \{(3, 3), (-3, -3)\}$

[b] $\therefore n(x) = \frac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \div \frac{x+3}{x^2+3x+9}$

$\therefore \text{The domain of } n = \mathbb{R} - \{3, -3\}$

$\therefore n(x) = \frac{(x+3)(x+1)}{(x-3)(x^2+3x+9)} \times \frac{x^2+3x+9}{x+3}$
 $= \frac{x+1}{x-3}$

$\therefore n(2) = \frac{2+1}{2-3} = \frac{3}{-1} = -3$

$\therefore n(-3)$ undefined because $-3 \notin \text{the domain of } n$

4

[a] Let the length be x cm. and the width be y cm.

$\therefore x = y + 4 \quad (1)$

$\therefore 28 = 2(x + y) \quad \therefore x + y = 14 \quad (2)$

Substituting from (1) in (2):

$\therefore y + 4 + y = 14 \quad \therefore 2y = 10 \quad \therefore y = 5$

Substituting in (1): $\therefore x = 9$

$\therefore \text{The length} = 9 \text{ cm. , the width} = 5 \text{ cm.}$

$\therefore \text{The area} = 9 \times 5 = 45 \text{ cm}^2$

[b] 1 $\therefore n(x) = \frac{x(x-2)}{(x-2)(x-1)}$

$\therefore n^{-1}(x) = \frac{(x-2)(x-1)}{x(x-2)}$

$\therefore \text{The domain of } n^{-1} = \mathbb{R} - \{0, 1, 2\}$

$\therefore n^{-1}(x) = \frac{x-1}{x}$

2 $\therefore n^{-1}(x) = 3 \quad \therefore \frac{x-1}{x} = 3$

$\therefore 3x = x-1 \quad \therefore 3x-x = -1$

$\therefore 2x = -1 \quad \therefore x = \frac{-1}{2}$

5

[a] $\therefore n_1(x) = \frac{x^2}{x^2(x-1)}$

$\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\}$
 $\therefore n_1(x) = \frac{1}{x-1}$ } (1)

$\therefore n_2(x) = \frac{x(x^2+x+1)}{x(x-1)(x^2+x+1)}$

$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\}$
 $\therefore n_2(x) = \frac{1}{x-1}$ } (2)

From (1) and (2): $\therefore n_1 = n_2$

[b] 1 $P(A \cap B) = \frac{2}{6} = \frac{1}{3}$

2 $P(A - B) = \frac{1}{6}$

3 The probability of non-occurrence of the event $A = \frac{3}{6} = \frac{1}{2}$

Model 2

1

- 1 a 2 d 3 a 4 b 5 c 6 a

2

[a] $\therefore 3x^2 - 5x + 1 = 0$

$\therefore a = 3, b = -5, c = 1$

$$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{25 - 12}}{6}$$

$$= \frac{5 \pm \sqrt{13}}{6}$$

$$\therefore x \approx 1.43 \text{ or } x \approx 0.23$$

$$\therefore \text{The S.S.} = \{1.43, 0.23\}$$

$$[b] \therefore n(x) = \frac{(x-2)(x^2+2x+4)}{(x-2)(x+3)} \times \frac{x+3}{x^2+2x+4}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -3\}$$

$$n(x) = 1$$

3

$$[a] \therefore x - y = 1 \quad \therefore x = y + 1 \quad (1)$$

$$x^2 + y^2 = 25 \quad (2)$$

Substituting from (1) in (2):

$$\therefore (y+1)^2 + y^2 = 25$$

$$\therefore y^2 + 2y + 1 + y^2 - 25 = 0$$

$$\therefore 2y^2 + 2y - 24 = 0 \quad \therefore y^2 + y - 12 = 0$$

$$\therefore (y-3)(y+4) = 0$$

$$\therefore y = 3 \text{ or } y = -4$$

$$\text{Substituting in (1): } \therefore x = 4 \text{ or } x = -3$$

$$\therefore \text{The S.S.} = \{(4, 3), (-3, -4)\}$$

$$[b] \text{ [1] } P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= 0.3 + 0.6 - 0.2 = 0.7$$

$$\text{[2] } P(A - B) = P(A) - P(A \cap B)$$

$$= 0.3 - 0.2 = 0.1$$

4

$$[a] \therefore 2x - y = 3 \quad \therefore y = 2x - 3 \quad (1)$$

$$x + 2y = 4 \quad (2)$$

Substituting from (1) in (2):

$$\therefore x + 2(2x - 3) = 4$$

$$\therefore x + 4x - 6 = 4 \quad \therefore 5x = 10 \quad \therefore x = 2$$

$$\text{Substituting in (1): } \therefore y = 1$$

$$[b] \therefore n(x) = \frac{x(x+3)}{(x+3)(x-3)} \div \frac{2x}{x+3}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{-3, 3, 0\}$$

$$n(x) = \frac{x}{x-3} \times \frac{x+3}{2x} = \frac{x+3}{2(x-3)}$$

5

$$[a] \therefore n(x) = \frac{x(x+2)}{(x-2)(x+2)} + \frac{x+3}{(x-2)(x-3)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -2, 3\}$$

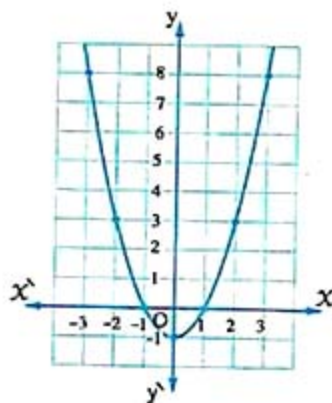
$$n(x) = \frac{x}{(x-2)} + \frac{x+3}{(x-2)(x-3)}$$

$$= \frac{x(x-3) + x+3}{(x-2)(x-3)} = \frac{x^2 - 3x + x + 3}{(x-2)(x-3)}$$

$$= \frac{x^2 - 2x + 3}{(x-2)(x-3)}$$

$$[b] f(x) = x^2 - 1$$

x	-3	-2	-1	0	1	2	3
y	8	3	0	-1	0	3	8



From the graph:

$$\therefore \text{The S.S.} = \{-1, 1\}$$

Model examination for the merge students

1

$$\text{[1] } 0$$

$$\text{[2] } \frac{1}{x-2}$$

$$\text{[3] } \frac{2}{3}$$

$$\text{[4] second}$$

$$\text{[5] second}$$

$$\text{[6] } \{5\}$$

2

$$\text{[1] } a$$

$$\text{[2] } b$$

$$\text{[3] } c$$

$$\text{[4] } b$$

$$\text{[5] } c$$

$$\text{[6] } a$$

3

$$\text{[1] } x$$

$$\text{[2] } x$$

$$\text{[3] } \checkmark$$

$$\text{[4] } \checkmark$$

$$\text{[5] } x$$

$$\text{[6] } \checkmark$$

4

$$\text{[1] } \{(2, 1)\}$$

$$\text{[2] } \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{[3] } \mathbb{R} - \{1, -1\}$$

$$\text{[4] } \frac{x}{x^2 + 4}$$

$$\text{[5] } \{5\}$$

$$\text{[6] } \frac{1}{3}$$

Answers of governorates' examinations of algebra & probability

1

Cairo

First Group :

- 1 c 2 d 3 a 4 b 5 b
6 c 7 d 8 a 9 c

Second Group :

- 10 $\therefore 2x - y = 3$ (1)
 $x + y = 9$ (2)
 By adding (1) and (2):
 $\therefore 3x = 12 \quad \therefore x = 4$
 By substitution in (2): $\therefore y = 5$
 $\therefore$ The S.S. = $\{(4, 5)\}$
- 11 $\therefore x - y = 2$ (1)
 $x \cdot y = 24$ (2)
 By substitution from (1) in (2):
 $\therefore (2 + y) \times y = 24 \quad \therefore y^2 + 2y - 24 = 0$
 $\therefore (y - 4)(y + 6) = 0$
 $\therefore y = 4$ or $y = -6$ (Refused)
 By substitution in (1): $\therefore x = 6$
 $\therefore$ The two numbers are 6, 4
- 12 $\therefore n_1(x) = \frac{(x-3)(x+3)}{(x+3)}$
 $\therefore$ The domain of $n_1 = \mathbb{R} - \{-3\}$
 $n_1(x) = x - 3$
 $\therefore n_2(x) = \frac{2(x-3)}{2}$
 $\therefore$ The domain of $n_2 = \mathbb{R}$
 $n_2(x) = x - 3$
 $\therefore n_1(x) = n_2(x)$ for all values of $x \in \mathbb{R} - \{-3\}$
- 13 $\therefore n(x) = \frac{1}{x+2} + \frac{x+2}{(x+2)^2}$
 $\therefore$ The domain of $n = \mathbb{R} - \{-2\}$
 $n(x) = \frac{1}{x+2} + \frac{1}{x+2} = \frac{2}{x+2}$
- 14 $\therefore a = 3, b = -5, c = 1$
 $\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$
 $\therefore x = 1.4$ or $x = 0.2$
 $\therefore$ The S.S. = $\{1.4, 0.2\}$

$$\text{15} \therefore n(x) = \frac{(x+3)(x-2)}{(x-2)(x^2+2x+4)} \times \frac{x^2+2x+4}{x+3}$$

$\therefore$ The domain of $n = \mathbb{R} - \{2, -3\}$

$$n(x) = 1$$

$$\text{16} (1) P(A \cap B) = 1 - P(A \cup B) = 1 - \frac{1}{3} = \frac{2}{3}$$

$$(2) P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{1}{2} + \frac{2}{3} - \frac{1}{3} = \frac{5}{6}$$

2

Giza

First Group :

- 1 d 2 a 3 c 4 b 5 a
6 b 7 b 8 d 9 c

Second Group :

- 10 $\therefore n(x) = \frac{x+2}{x^2+3x+2} + \frac{x^2-x}{x^2-1}$
 $= \frac{x+2}{(x+2)(x+1)} + \frac{x(x-1)}{(x-1)(x+1)}$
 $\therefore$ The domain of $n = \mathbb{R} - \{-2, -1, 1\}$
 $n(x) = \frac{1}{x+1} + \frac{x}{x+1} = \frac{1+x}{x+1} = 1$
- 11 $\therefore x - y = 0$ (1)
 $x \cdot y = 16$ (2)
 By substitution from (1) in (2):
 $\therefore x^2 = 16 \quad \therefore x = 4$ or $x = -4$
 By substitution in (1):
 $\therefore y = 4$ or $y = -4$
 $\therefore$ The S.S. = $\{(4, 4), (-4, -4)\}$
- 12 $\therefore a = 1, b = -6, c = 4$
 $\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 4}}{2 \times 1} = \frac{6 \pm 2\sqrt{5}}{2} = 3 \pm \sqrt{5}$
 $\therefore x = 5.2$ or $x = 0.8$
 $\therefore$ The S.S. = $\{5.2, 0.8\}$
- 13 (1) $P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.7 + 0.5 - 0.3 = 0.9$
 (2) $P(B - A) = P(B) - P(A \cap B) = 0.5 - 0.3 = 0.2$
- 14 $\therefore n_1(x) = \frac{5x}{5(x+5)}$
 $\therefore$ The domain of $n_1 = \mathbb{R} - \{-5\}$ (1)
 $n_1(x) = \frac{x}{x+5}$

$$n_2(x) = \frac{x(x+5)}{(x+5)^2}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-5\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (2)$$

$$n_2(x) = \frac{x}{x+5}$$

From (1), (2) : $\therefore n_1 = n_2$

$$[15] \therefore n(x) = \frac{(x-2)(x^2+2x+4)}{(x+3)(x-2)} \times \frac{2(x+3)}{x^2+2x+4}$$

$\therefore$ The domain of $n = \mathbb{R} - \{-3, 2\}$, $n(x) = 2$

$$[16] \therefore 3x + 2y = 4 \quad (1)$$

$$x - 3y = 5 \quad \therefore x = 5 + 3y \quad (2)$$

By substitution from (2) in (1) :

$$\therefore 3(5 + 3y) + 2y = 4 \quad \therefore 15 + 9y + 2y = 4$$

$$\therefore 11y = -11 \quad \therefore y = -1$$

By substitution in (2) : $\therefore x = 2$

$\therefore$ The S.S. = $\{(2, -1)\}$

3

Alexandria

First Group :

$$[1] d \quad [2] b \quad [3] a$$

$$[4] \therefore a = 1, b = -5, c = 2$$

$$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 2}}{2 \times 1} = \frac{5 \pm \sqrt{17}}{2} = \frac{5 \pm 4.12}{2}$$

$$\therefore x = 4.56 \text{ or } x = 0.44$$

$\therefore$ The S.S. = $\{4.56, 0.44\}$

$$[5] c \quad [6] b \quad [7] a$$

$$[8] \therefore x + y = 7 \quad (1)$$

$$x - y = 3 \quad (2)$$

By adding (1), (2) : $\therefore 2x = 10 \quad \therefore x = 5$

By substitution in (1) : $\therefore y = 2$

$\therefore$ The S.S. = $\{(5, 2)\}$

$$[9] n_1(x) = \frac{x^2}{x(x-1)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (1)$$

$$n_1(x) = \frac{x}{x-1}$$

$$\therefore n_2(x) = \frac{x^2(x-1)}{x(x-1)^2}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (2)$$

$$n_2 = \frac{x}{x-1}$$

From (1), (2) : $\therefore n_1 = n_2$

$$[10] n(x) = \frac{x-5}{(x-5)(x+3)} \div \frac{8}{2(x+3)}$$

$\therefore$ The domain of $n = \mathbb{R} - \{5, -3\}$

$$n(x) = \frac{1}{x+3} \times \frac{x+3}{4} = \frac{1}{4}$$

$$[11] \therefore n(x) = \frac{3(x-3)}{(x-3)(x-2)}$$

$$\therefore n^{-1}(x) = \frac{(x-3)(x-2)}{3(x-3)}$$

$\therefore$ The domain of $n^{-1} = \mathbb{R} - \{3, 2\}$

$$n^{-1}(x) = \frac{x-2}{3}$$

$n^{-1}(3)$ is undefined because $3 \notin$ the domain of n^{-1}

$$[12] (1) P(A \cup B) = P(A) + P(B) - P(A \cap B) \\ = 0.4 + 0.5 - 0.2 = 0.7$$

(2) The probability of the non-occurrence of the event $A = P(\bar{A}) = 1 - P(A) = 1 - 0.4 = 0.6$

$$[13] b \quad [14] b \quad [15] a$$

$$[16] \therefore n(x) = \frac{x(x+4)}{(x-4)(x+4)} + \frac{x-3}{(x-3)(x-4)}$$

$\therefore$ The domain of $n = \mathbb{R} - \{4, -4, 3\}$

$$n(x) = \frac{x}{x-4} + \frac{1}{x-4} = \frac{x+1}{x-4}$$

4

El-Kalyoubia

First Group :

$$[1] a \quad [2] c \quad [3] b \quad [4] c \quad [5] d$$

$$[6] a \quad [7] a \quad [8] d \quad [9] a$$

Second Group :

$$[10] \therefore x + 2y = 5$$

$$\therefore x = 5 - 2y \quad (1)$$

$$\therefore 2x + y = 1 \quad (2)$$

By substitution from (1) in (2) :

$$\therefore 2(5 - 2y) + y = 1 \quad \therefore 10 - 4y + y = 1$$

$$\therefore 10 - 3y = 1 \quad \therefore -3y = -9$$

$$\therefore y = 3$$

By substitution in (1) : $\therefore x = -1$

$\therefore$ The S.S. = $\{(-1, 3)\}$

$$[11] \therefore a = 2, b = -6, c = 1$$

$$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 2 \times 1}}{2 \times 2}$$

$$\therefore x = \frac{6 \pm 2\sqrt{7}}{4} = \frac{3 \pm \sqrt{7}}{2}$$

$$\therefore x \approx 2.82 \text{ or } x = 0.18$$

$$\therefore \text{The S.S.} = \{2.82, 0.18\}$$

$$[12] \therefore x = 2y$$

$$, x^2 + y^2 = 20$$

By substitution from (1) in (2):

$$\therefore (2y)^2 + y^2 = 20 \quad \therefore 4y^2 + y^2 = 20$$

$$\therefore 5y^2 = 20 \quad \therefore y^2 = 4$$

$$\therefore y = 2 \text{ or } y = -2$$

By substitution in (1):

$$\therefore x = 4 \text{ or } x = -4$$

$$\therefore \text{The S.S.} = \{(4, 2), (-4, -2)\}$$

$$[13] \therefore n_1(x) = \frac{2}{2(x+3)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{-3\} \quad \left. \begin{array}{l} \\ , n_1(x) = \frac{1}{x+3} \end{array} \right\} (1)$$

$$, \therefore n_2(x) = \frac{x^2 - 3x + 9}{(x+3)(x^2 - 3x + 9)}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-3\} \quad \left. \begin{array}{l} \\ , n_2(x) = \frac{1}{x+3} \end{array} \right\} (2)$$

$$\text{From (1), (2): } \therefore n_1 = n_2$$

$$[14] \therefore n(x) = \frac{x(x+4)}{(x+4)(x-4)} + \frac{4(x+2)}{(x-4)(x+2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{-4, 4, -2\}$$

$$, n(x) = \frac{x}{x-4} + \frac{4}{x-4} = \frac{x+4}{x-4}$$

$$[15] \therefore n(x) = \frac{x+1}{x-2} \times \frac{(x+2)(x-1)}{(x+1)(x-1)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -1, 1\}$$

$$, n(x) = \frac{x+2}{x-2}$$

$$[16] (1) P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$0.9 = 0.5 + 0.6 - P(A \cap B)$$

$$\therefore P(A \cap B) = 0.5 + 0.6 - 0.9 = 0.2$$

$$(2) P(A - B) = P(A) - P(A \cap B)$$

$$= 0.5 - 0.2 = 0.3$$

$$(3) P(\bar{A}) + P(\bar{B})$$

$$= (1 - P(A)) + (1 - P(B))$$

$$= (1 - 0.5) + (1 - 0.6) = 0.9$$

5

El-Sharkia

First Questions :

(1)

$$(2) [a] \therefore n(x) = \frac{(x-2)(x^2+2x+4)}{(x-3)(x+3)} \times \frac{x+3}{(x^2+2x+4)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{3, -3\}$$

$$, n(x) = \frac{x-2}{x-3}$$

$$[b] (1) P(A) = 1 - P(\bar{A}) = 1 - 0.4 = 0.6$$

$$(2) \therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\therefore 0.8 = 0.6 + 0.5 - P(A \cap B)$$

$$\therefore P(A \cap B) = 0.6 + 0.5 - 0.8 = 0.3$$

Second Questions :

$$[a] (1) d \quad (2) c \quad (3) c$$

$$[b] \therefore a = 2, b = -4, c = 1$$

$$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{4 \pm 2\sqrt{2}}{4} = \frac{2 \pm \sqrt{2}}{2}$$

$$\therefore x \approx 1.71 \text{ or } x \approx 0.29$$

$$\therefore \text{The S.S.} = \{1.71, 0.29\}$$

Third Questions :

$$[a] \therefore n(x) = \frac{x^2 - 3x + 2}{x^2 - 4} + \frac{x^2 - 3x}{x^2 - x - 6}$$

$$= \frac{(x-2)(x-1)}{(x-2)(x+2)} + \frac{x(x-3)}{(x-3)(x+2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -2, 3\}$$

$$, n(x) = \frac{x-1}{x+2} + \frac{x}{x+2} = \frac{2x-1}{x+2}$$

$$[b] \therefore x - y = 3 \quad (1)$$

$$, 2x + y = 6 \quad (2)$$

By adding (1), (2):

$$\therefore 3x = 9 \quad \therefore x = 3$$

By substitution in (1): $\therefore y = 0$

$$\therefore \text{The S.S.} = \{(3, 0)\}$$

Fourth Questions :

$$[a] (1) c \quad (2) a \quad (3) b$$

$$[b] \therefore n_1(x) = \frac{5x}{5(x+2)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \quad \left. \begin{array}{l} \\ , n_1(x) = \frac{x}{x+2} \end{array} \right\} (1)$$

$$\therefore n_2(x) = \frac{x(x+2)}{(x+2)^2}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\}$$

$$\therefore n_2(x) = \frac{x}{x+2} \quad (2)$$

From (1), (2): $\therefore n_1 = n_2$

Fifth Questions :

[a] (1) d (2) a (3) b

[b] $\therefore x - y = 1 \quad \therefore x = y + 1 \quad (1)$

$\therefore y^2 + x = 7 \quad (2)$

By substitution from (1) in (2):

$\therefore y^2 + y + 1 = 7 \quad \therefore y^2 + y - 6 = 0$

$\therefore (y+3)(y-2) = 0 \quad \therefore y = -3 \text{ or } y = 2$

By substitution in (1):

$\therefore x = -2 \text{ or } x = 3$

$\therefore \text{The S.S.} = \{(-2, -3), (3, 2)\}$

6

El-Monofia

First Questions :

[a] (1) c (2) d (3) d

[b] $\therefore x - y = 7 \quad \therefore x = y + 7 \quad (1)$

$\therefore xy = 18 \quad (2)$

By substitution from (1) in (2):

$\therefore (y+7) \times y = 18 \quad \therefore y^2 + 7y - 18 = 0$

$\therefore (y+9)(y-2) = 0 \quad \therefore y = -9 \text{ or } y = 2$

By substitution in (1):

$\therefore x = -2 \text{ or } x = 9$

$\therefore \text{The S.S.} = \{(-2, -9), (9, 2)\}$

Second Questions :

[a] (1) a (2) b (3) c

[b] $\therefore n(x) = \frac{x^2 + 2x + 4}{(x-2)(x^2 + 2x + 4)} + \frac{(x+2)(x-1)}{(x+2)(x-2)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{2, -2\}$

$\therefore n(x) = \frac{1}{x-2} + \frac{x-1}{x-1} = \frac{x}{x-2}$

Third Questions :

[a] (1) b (2) c (3) b

[b] $\therefore n_1(x) = \frac{2x}{2(x+4)}$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{-4\} \quad (1)$$

$\therefore n_1(x) = \frac{x}{x+4}$

$\therefore n_2(x) = \frac{x(x+4)}{(x+4)^2}$

$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-4\} \quad (2)$

$\therefore n_2(x) = \frac{x}{x+4}$

From (1), (2): $\therefore n_1 = n_2$

Fourth Questions :

[a] (1) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{2} + \frac{1}{4} - \frac{1}{8} = \frac{5}{8}$

(2) $P(A - B) = P(A) - P(A \cap B) = \frac{1}{2} - \frac{1}{8} = \frac{3}{8}$

(3) $P(B) = 1 - P(A) = 1 - \frac{1}{4} = \frac{3}{4}$

[b] $\therefore n(x) = \frac{2x(x+2)}{(x+2)(x-2)} \times \frac{x-2}{2(x+3)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{-2, 2, -3\}$

$\therefore n(x) = \frac{x}{x+3}$

Fifth Questions :

[a] $\therefore 2x - y = 3 \quad (1)$

$\therefore x + 2y = 4 \quad \therefore x = 4 - 2y \quad (2)$

By substitution from (2) in (1):

$\therefore 2(4 - 2y) - y = 3 \quad \therefore 8 - 4y - y = 3$

$\therefore -5y = -5 \quad \therefore y = 1$

By substitution in (2): $\therefore x = 2$

$\therefore \text{The S.S.} = \{(2, 1)\}$

[b] $\therefore a = 1, b = -2, c = -4$

$\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -4}}{2 \times 1}$

$x = \frac{2 \pm 2\sqrt{5}}{2} = 1 \pm \sqrt{5}$

$\therefore x \approx 3.24 \text{ or } x \approx -1.24$

$\therefore \text{The S.S.} = \{3.24, -1.24\}$

7

El-Gharbia

First Group :

- 1 b 2 a 3 c 4 b 5 d
6 b 7 a 8 c 9 a

Second Group :

$$[10] \because n_1(x) = \frac{x}{x(x-1)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (1)$$

$$, n_1(x) = \frac{1}{x-1}$$

$$, \because n_2(x) = \frac{x^2+x+1}{(x-1)(x^2+x+1)}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (2)$$

$$, n_2(x) = \frac{1}{x-1}$$

From (1) and (2) : $\therefore n_1 \neq n_2$

Because the domain of $n_1 \neq$ the domain of n_2

$$[11] n(x) = \frac{x(x+2)}{(x-3)(x^2+x+9)} \div \frac{x+2}{x^2+3x+9}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{3, -2\}$$

$$, n(x) = \frac{x(x+2)}{(x-3)(x^2+3x+9)} \times \frac{x^2+3x+9}{x+2} = \frac{x}{x-3}$$

$, n(-2)$ is undefined because $-2 \notin$ the domain of n

$$[12] \because a = 2, b = -4, c = 1$$

$$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 2 \times 1}}{2 \times 2} = \frac{4 \pm 2\sqrt{2}}{4} = \frac{2 \pm \sqrt{2}}{2}$$

$$\therefore x = 1.71 \text{ or } x = 0.29$$

$$\therefore \text{The S.S.} = \{1.71, 0.29\}$$

$$[13] \because n(x) = \frac{x(x-3)}{(x-3)(x-2)} - \frac{2(x+2)}{(x+2)(x-2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{3, 2, -2\}$$

$$, n(x) = \frac{x}{x-2} - \frac{2}{x-2} = \frac{x-2}{x-2} = 1$$

$$[14] \because x+y=3 \quad \therefore y=3-x \quad (1)$$

$$, \because xy=2 \quad (2)$$

By substitution from (1) in (2) :

$$\therefore x(3-x)=2 \quad \therefore 3x-x^2=2$$

$$\therefore x^2-3x+2=0 \quad \therefore (x-2)(x-1)=0$$

$$\therefore x=2 \text{ or } x=1$$

By substitution in (1) :

$$\therefore y=1 \text{ or } y=2$$

$$\therefore \text{The S.S.} = \{(2, 1), (1, 2)\}$$

$$[15] P(A) = 1 - P(\bar{A}) = 1 - 0.3 = 0.7$$

$$P(A-B) = P(A) - P(A \cap B) = 0.7 - 0.3 = 0.4$$

$$[16] \because (3, -1) \text{ is a solution of the equation :}$$

$$aX + bY - 5 = 0 \quad \therefore 3a - b - 5 = 0$$

$$\therefore 3a - b = 5 \quad (1)$$

$$, \because (3, -1) \text{ is a solution of the equation :}$$

$$3aX + bY = 17 \quad \therefore 9a - b = 17$$

$$\therefore -9a + b = -17 \quad (2)$$

$$\text{By adding (1) and (2) : } \therefore -6a = -12 \quad \therefore a = 2$$

$$\text{By substitution in (1) : } \therefore b = 1$$

8

El-Dakahlia

First Questions :

$$[a] (1) d \quad (2) a \quad (3) c$$

$$[b] \because a = 1, b = -6, c = 4$$

$$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 4}}{2 \times 1} = \frac{6 \pm 2\sqrt{5}}{2} = 3 \pm \sqrt{5}$$

$$\therefore x = 5.236 \text{ or } x = 0.764$$

$$\therefore \text{The S.S.} = \{5.236, 0.764\}$$

Second Questions :

$$[a] (1) a \quad (2) d \quad (3) b$$

$$[b] \because n_1(x) = \frac{2x}{2(x+2)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{-2\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (1)$$

$$, n_1(x) = \frac{x}{x+2}$$

$$, n_2(x) = \frac{x(x+2)}{(x+2)^2}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-2\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (2)$$

$$, n_2(x) = \frac{x}{x+2}$$

From (1), (2) : $\therefore n_1 = n_2$

Third Questions :

$$[a] (1) c \quad (2) a \quad (3) d$$

$$[b] \because (1, 2) \text{ is a solution of the equation :}$$

$$aX + bY = -5$$

$$\therefore a + 2b = -5 \quad (1)$$

$$, \because (1, 2) \text{ is a solution of the equation :}$$

$$2aX + bY = 2$$

$$\therefore 2a + 2b = 2 \quad \therefore a + b = 1$$

$$\therefore -a - b = -1 \quad (2)$$

$$\text{By adding (1) and (2) : } \therefore b = -6$$

$$\text{By substitution in (1) : } \therefore a = 7$$

Fourth Questions :

$$[a] \because n(x) = \frac{x^2 - 2x + 4}{(x+2)(x^2 - 2x + 4)} + \frac{(x-1)(x+1)}{(x-1)(x+2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{-2, 1\}$$

$$, n(x) = \frac{1}{x+2} + \frac{x+1}{x+2} = \frac{x+2}{x+2} = 1$$

$$[b] (1) P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= 0.5 + 0.4 - 0.1 = 0.8$$

$$(2) P(B - A) = P(B) - P(A \cap B) = 0.4 - 0.1 = 0.3$$

Fifth Questions :

$$[a] (1) \because n(x) = \frac{x(x-2)}{(x-2)(x^2+2)}$$

$$\therefore n^{-1}(x) = \frac{(x-2)(x^2+2)}{x(x-2)}$$

$$\therefore \text{The domain of } n^{-1}(x) = \mathbb{R} - \{0, 2\}$$

$$, n^{-1}(x) = \frac{x^2+2}{x}$$

$$(2) \because n^{-1}(x) = 3 \quad \therefore \frac{x^2+2}{x} = 3$$

$$\therefore x^2 + 2 = 3x \quad \therefore x^2 - 3x + 2 = 0$$

$$\therefore (x-2)(x-1) = 0$$

$$\therefore x = 2 \text{ (refused) or } x = 1$$

[b] Let the length of the rectangle be x and the width be y .

$$\therefore x - y = 3 \quad \therefore x = 3 + y \quad (1)$$

$$, xy = 28 \quad (2)$$

By substituting from (1) in (2) :

$$\therefore (3+y) \times y = 28$$

$$\therefore 3y + y^2 = 28 \quad \therefore y^2 + 3y - 28 = 0$$

$$\therefore (y-4)(y+7) = 0$$

$$\therefore y = 4 \text{ or } y = -7 \text{ (refused)}$$

By substituting in (1) :

$$\therefore x = 7$$

$$\therefore \text{The length} = 7 \text{ cm, the width} = 4 \text{ cm}$$

$$\therefore \text{The perimeter} = 2(7+4) = 22 \text{ cm}$$

9

Ismailia

First Group :

$$[1] b \quad [2] a \quad [3] c \quad [4] b \quad [5] d$$

$$[6] c \quad [7] c \quad [8] d \quad [9] b$$

Second Group :

$$[10] \because 2x + y = 9 \quad (1)$$

$$, 3x - y = 6 \quad (2)$$

By adding (1) , (2) :

$$\therefore 5x = 15 \quad \therefore x = 3$$

By substitution in (2) : $\therefore y = 3$

$$\therefore \text{The S.S.} = \{(3, 3)\}$$

$$[11] \because n(x) = \frac{x(x+2)}{(x-2)(x+2)} + \frac{x-3}{(x-3)(x-2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -2, 3\}$$

$$, n(x) = \frac{x}{x-2} + \frac{1}{x-2} = \frac{x+1}{x-2}$$

$$[12] (1) \because P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\therefore 0.7 = 0.3 + 0.5 - P(A \cap B)$$

$$\therefore P(A \cap B) = 0.3 + 0.5 - 0.7 = 0.1$$

$$(2) P(B - A) = P(B) - P(A \cap B) = 0.5 - 0.1 = 0.4$$

$$[13] \because x - y = 1$$

$$\therefore x = y + 1 \quad (1)$$

$$, x^2 + y^2 = 25 \quad (2)$$

By substitution from (1) in (2) :

$$\therefore (y+1)^2 + y^2 = 25$$

$$\therefore y^2 + 2y + 1 + y^2 - 25 = 0$$

$$\therefore 2y^2 + 2y - 24 = 0 \quad \therefore y^2 + y - 12 = 0$$

$$\therefore (y+4)(y-3) = 0 \quad \therefore y = -4 \text{ or } y = 3$$

By substituting in (1) : $\therefore x = -3 \text{ or } x = 4$

$$\therefore \text{The S.S.} = \{(-3, -4), (4, 3)\}$$

$$[14] \because n_1(x) = \frac{1}{x-1} \quad \left. \begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{1\} \end{array} \right\} (1)$$

$$, n_2(x) = \frac{x^2 + x + 1}{(x-1)(x^2 + x + 1)}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{1\} \quad \left. \begin{array}{l} , n_2(x) = \frac{1}{x-1} \end{array} \right\} (2)$$

From (1) and (2) : $\therefore n_1 = n_2$

$$[15] \because a = 1, b = 3, c = 1$$

$$\therefore x = \frac{-3 \pm \sqrt{(3)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{-3 \pm \sqrt{5}}{2}$$

$$\therefore x = -0.38 \text{ or } x = -2.62$$

$$\therefore \text{The S.S.} = \{-0.38, -2.62\}$$

$$[16] \because n(x) = \frac{(x-3)^2}{x-3} \times \frac{15}{5(x-3)}$$

$$\therefore \text{The domain} = \mathbb{R} - \{3\}$$

$$, n(x) = 3$$

10

Port Said

First Group :

$$[1] c \quad [2] b \quad [3] a \quad [4] b \quad [5] c$$

$$[6] d \quad [7] a \quad [8] d \quad [9] c$$

Second Group :

$$\begin{aligned} \text{[10]} \quad \therefore n_1(x) &= \frac{(x-2)(x+2)}{(x-2)^2} \\ \therefore \text{The domain of } n_1 &= \mathbb{R} - \{2\} \\ \therefore n_1(x) &= \frac{x+2}{x-2} \\ \therefore n_2(x) &= \frac{x+2}{x-2} \\ \therefore \text{The domain of } n_2 &= \mathbb{R} - \{2\} \end{aligned} \quad \left. \begin{array}{l} (1) \\ (2) \end{array} \right\}$$

From (1) and (2) : $\therefore n_1 = n_2$

$$\begin{aligned} \text{[11]} \quad \therefore A \text{ and } B \text{ are mutually exclusive events} \\ \therefore P(A \cap B) &= 0 \\ \therefore P(A \cup B) &= P(A) + P(B) = \frac{3}{5} + \frac{1}{5} = \frac{4}{5} \end{aligned}$$

$$\begin{aligned} \text{[12]} \quad \therefore n(x) &= \frac{2x}{x+2} + \frac{4}{x+2} \\ \text{The domain of } n &= \mathbb{R} - \{-2\} \\ \therefore n(x) &= \frac{2x+4}{x+2} = \frac{2(x+2)}{x+2} = 2 \end{aligned}$$

$$\begin{aligned} \text{[13]} \quad \therefore n(x) &= \frac{x(x+3)}{(x-3)(x+3)} \times \frac{x-3}{2x} \\ \therefore \text{The domain of } n &= \mathbb{R} - \{3, -3, 0\} \\ \therefore n(x) &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{[14]} \quad \therefore a = 1, b = -5, c = 3 \\ \therefore x &= \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2 \times 1} = \frac{5 \pm \sqrt{13}}{2} \\ \therefore x &\approx 4.3 \text{ or } x \approx 0.7 \\ \therefore \text{The S.S.} &= \{4.3, 0.7\} \end{aligned}$$

$$\begin{aligned} \text{[15]} \quad \therefore x + y &= 5 \\ \therefore x - y &= 1 \end{aligned} \quad \begin{array}{l} (1) \\ (2) \end{array}$$

By adding (1) and (2) :

$$\therefore 2x = 6 \quad \therefore x = 3$$

By substitution in (1) : $\therefore y = 2$

$\therefore \text{The S.S.} = \{(3, 2)\}$

$$\begin{aligned} \text{[16]} \quad \therefore x - 2y &= 0 \\ \therefore x &= 2y \\ \therefore xy &= 8 \end{aligned} \quad \begin{array}{l} (1) \\ (2) \end{array}$$

By substitution from (1) in (2) :

$$\therefore 2y \times y = 8 \quad \therefore 2y^2 = 8$$

$$\therefore y^2 = 4 \quad \therefore y = 2 \text{ or } y = -2$$

By substitution in (1) :

$$\therefore x = 4 \text{ or } x = -4$$

$\therefore \text{The S.S.} = \{(4, 2), (-4, -2)\}$

11

Damietta

First Questions :

$$\begin{aligned} \text{[a]} \quad (1) \text{ d} \quad (2) \text{ c} \quad (3) \text{ b} \\ \text{[b]} \quad \therefore n(x) &= \frac{2x}{x(x-2)} - \frac{x+2}{(x+2)(x-2)} \\ \therefore \text{The domain of } n &= \mathbb{R} - \{0, 2, -2\} \\ \therefore n(x) &= \frac{2}{x-2} - \frac{1}{x-2} = \frac{1}{x-2} \end{aligned}$$

Second Questions :

$$\begin{aligned} \text{[a]} \quad (1) \text{ b} \quad (2) \text{ d} \quad (3) \text{ a} \\ \text{[b]} \quad \therefore n(x) &= \frac{x(x+2)}{(x-3)(x^2+3x+9)} \div \frac{x+2}{x^2+3x+9} \\ \therefore \text{The domain of } n &= \mathbb{R} - \{3, -2\} \\ \therefore n(x) &= \frac{x(x+2)}{(x-3)(x^2+3x+9)} \times \frac{x^2+3x+9}{x+2} \\ &= \frac{x}{x-3} \end{aligned}$$

Third Questions :

$$\begin{aligned} \text{[a]} \quad (1) \text{ d} \quad (2) \text{ a} \quad (3) \text{ b} \\ \text{[b]} \quad \therefore n_1(x) &= \frac{x+5}{(x+5)(x-5)} \\ \therefore \text{The domain of } n_1 &= \mathbb{R} - \{-5, 5\} \\ \therefore n_1(x) &= \frac{1}{x-5} \\ \therefore n_2(x) &= \frac{3}{3(x-5)} \\ \therefore \text{The domain of } n_2 &= \mathbb{R} - \{5\} \\ \therefore n_2(x) &= \frac{1}{x-5} \end{aligned} \quad \left. \begin{array}{l} (1) \\ (2) \end{array} \right\}$$

From (1) and (2) : $\therefore n_1 \neq n_2$
because the domain of $n_1 \neq$ the domain of n_2

Fourth Questions :

$$\begin{aligned} \text{[a]} \quad \therefore x + y &= 1 \\ \therefore x - y &= 3 \end{array} \quad \begin{array}{l} (1) \\ (2) \end{array}$$

By adding (1) , (2) : $\therefore 2x = 4 \quad \therefore x = 2$

By substitution in (1) : $\therefore y = -1$

$\therefore \text{The S.S.} = \{(2, -1)\}$

$\text{[b]} \quad \therefore A \text{ and } B \text{ are two mutually exclusive events}$

$$\therefore P(A \cap B) = 0$$

$$\therefore P(A \cup B) = P(A) + P(B)$$

$$\therefore \frac{7}{12} = \frac{1}{3} + P(B)$$

$$\therefore P(B) = \frac{7}{12} - \frac{1}{3} = \frac{1}{4}$$

Fifth Questions :

[a] $\therefore x - 2y = 0$

$\therefore x = 2y$

$\therefore x^2 + y^2 = 20$

By substitution from (1) in (2) :

$\therefore (2y)^2 + y^2 = 20$

$\therefore 4y^2 + y^2 = 20$

$\therefore y^2 = 4$

$\therefore 5y^2 = 20$

$\therefore y = 2 \text{ or } y = -2$

By substituting in (1) :

$\therefore x = 4 \text{ or } x = -4$

$\therefore \text{The S.S.} = \{(4, 2), (-4, -2)\}$

[b] $\therefore a = 1, b = -4, c = 1$

$\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1} = \frac{4 \pm 2\sqrt{3}}{2} = 2 \pm \sqrt{3}$
 $= 2 \pm 1.7$

$\therefore x = 3.7 \text{ or } x = 0.3$

$\therefore \text{The S.S.} = \{3.7, 0.3\}$

12

Kafr El-Sheikh

First Group :

1 a 2 b 3 d 4 d 5 d

6 a 7 c 8 c 9 a

Second Group :

[10] $\therefore x^2 - 5x - 7 = 0$

$\therefore a = 1, b = -5, c = -7$

$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 1 \times -7}}{2 \times 1} = \frac{5 \pm \sqrt{53}}{2}$

$\therefore x \approx 6.1 \text{ or } x \approx -1.1$

$\therefore \text{The S.S.} = \{6.1, -1.1\}$

[11] (1) $\therefore n(x) = \frac{x(x-2)}{(x-2)(x-1)}$

$\therefore n^{-1}(x) = \frac{(x-2)(x-1)}{x(x-2)}$

$\therefore \text{The domain of } n^{-1} = \mathbb{R} - \{2, 1, 0\}$

$\therefore n^{-1}(x) = \frac{x-1}{x}$

(2) $\therefore n^{-1}(x) = 3 \quad \therefore \frac{x-1}{x} = 3$

$\therefore 3x = x - 1 \quad \therefore 2x = -1$

$\therefore x = -\frac{1}{2}$

[12] $\therefore 3x + 2y = 7$

$\therefore 2x + y = 4 \text{ (multiply by } -2)$

$\therefore -4x - 2y = -8$

By adding (1) and (2) :

$\therefore -x = -1 \quad \therefore x = 1$

By substitution in (1) : $\therefore y = 2$

$\therefore \text{The S.S.} = \{(1, 2)\}$

[13] $P(B) = 1 - P(\bar{B}) = 1 - 0.7 = 0.3$

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\therefore 0.6 = 0.5 + 0.3 - P(A \cap B)$

$\therefore P(A \cap B) = 0.5 + 0.3 - 0.6 = 0.2$

[14] $\therefore n_1(x) = \frac{x^2}{x^2(x-1)}$

$\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\}$

$\therefore n_1(x) = \frac{1}{x-1}$

$\therefore n_2(x) = \frac{x(x^2+x+1)}{x(x-1)(x^2+x+1)}$

$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\}$

$\therefore n_2(x) = \frac{1}{x-1}$

From (1) and (2) : $\therefore n_1 = n_2$

[15] $\therefore x - y = 1 \quad \therefore x = y + 1$ (1)

$\therefore y^2 = 13 - x^2$ (2)

By substituting from (1) in (2) :

$\therefore y^2 = 13 - (y+1)^2 \quad \therefore y^2 = 13 - y^2 - 2y - 1$

$\therefore 2y^2 + 2y - 12 = 0 \quad \therefore y^2 + y - 6 = 0$

$\therefore (y+3)(y-2) = 0 \quad \therefore y = -3 \text{ or } y = 2$

By substitution in (1) :

$\therefore x = -2 \text{ or } x = 3$

$\therefore \text{The S.S.} = \{(-2, -3), (3, 2)\}$

[16] $\therefore n(x) = \frac{x^2 - 3x}{x^2 - 9} + \frac{x-1}{x^2 + 2x - 3}$
 $= \frac{x(x-3)}{(x-3)(x+3)} + \frac{x-1}{(x+3)(x-1)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{3, -3, 1\}$

$\therefore n(x) = \frac{x}{x+3} + \frac{1}{x+3} = \frac{x+1}{x+3}$

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El-Beheira

First Group :

1 b 2 a 3 c 4 b 5 b

6 a 7 d 8 d 9 c

Second Group :

[10] $\therefore 3x + y = 9$ (1)

$\therefore 2x - y = 1$ (2)

By adding (1) and (2) :

$$\therefore 5x = 10 \quad \therefore x = 2$$

By substitution in (1) : $\therefore y = 3$

$$\therefore \text{The S.S.} = \{(2, 3)\}$$

$$[11] \therefore n(x) = \frac{(x+2)(x+4)}{(x+2)(x-2)} - \frac{x(x-5)}{(x-5)(x-2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{-2, 2, 5\}$$

$$\therefore n(x) = \frac{x+4}{x-2} - \frac{x}{x-2} = \frac{4}{x-2}$$

$$[12] \therefore a = 1, b = 2, c = -4$$

$$\therefore x = \frac{-2 \pm \sqrt{(2)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{-2 \pm 2\sqrt{5}}{2} = -1 \pm \sqrt{5}$$

$$\therefore x = 1.24 \text{ or } x = -3.24$$

$$\therefore \text{The S.S.} = \{1.24, -3.24\}$$

$$[13] \therefore n(x) = \frac{(x-2)(x-3)}{(x-2)(x^2+2x+4)} \div \frac{x-3}{x^2+2x+4}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, 3\}$$

$$\therefore n(x) = \frac{x-3}{x^2+2x+4} \times \frac{x^2+2x+4}{x-3} = 1$$

$$[14] \therefore x - y = 1 \quad \therefore y = x - 1$$

$$\therefore x^2 - xy = 3$$

By substitution from (1) in (2) :

$$\therefore x^2 - x(x-1) = 3$$

$$\therefore x^2 - x^2 + x = 3$$

$$\therefore x = 3$$

By substitution in (1) : $\therefore y = 2$

$$\therefore \text{The S.S.} = \{(3, 2)\}$$

$$[15] \therefore n_1(x) = \frac{x^2}{x^2(x-1)} \quad \therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (1)$$

$$\therefore n_1(x) = \frac{1}{x-1}$$

$$\therefore n_2(x) = \frac{x(x^2+x+1)}{x(x-1)(x^2+x+1)}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 1\} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} (2)$$

$$\text{From (1), (2) : } \therefore n_1 = n_2$$

$$[16] (1) P(A^c) = 1 - P(A) = 1 - 0.7 = 0.3$$

$$(2) P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.7 + 0.6 - 0.4 = 0.9$$

$$(3) P(A - B) = P(A) - P(A \cap B) = 0.7 - 0.4 = 0.3$$

First Questions :

$$(1) d \quad (2) c \quad (3) c$$

$$(4) a \quad (5) d \quad (6) b$$

Second Questions :

$$[a] \therefore y - x = -3 \quad \therefore y = x - 3 \quad (1)$$

$$\therefore x^2 + y^2 = 5 \quad (2)$$

By substitution from (1) in (2) :

$$\therefore x^2 + (x-3)^2 = 5$$

$$\therefore x^2 + x^2 - 6x + 9 = 5$$

$$\therefore 2x^2 - 6x + 4 = 0 \quad \therefore x^2 - 3x + 2 = 0$$

$$\therefore (x-1)(x-2) = 0 \quad \therefore x = 1 \text{ or } x = 2$$

By substitution in (1) :

$$\therefore y = -2 \text{ or } y = -1$$

$$\therefore \text{The S.S.} = \{(1, -2), (2, -1)\}$$

$$[b] \therefore n(x) = \frac{3x(x-2)}{(x-2)(x+2)} \div \frac{x(x+1)}{(x+1)(x+2)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -2, -1, 0\}$$

$$\therefore n(x) = \frac{3x}{x+2} \times \frac{x+2}{x} = 3$$

Third Questions :

$$[a] \therefore f(x) = \frac{2x-6}{x^2-9} + \frac{8}{x^2+2x-3} = \frac{2(x-3)}{(x-3)(x+3)} + \frac{8}{(x+3)(x-1)}$$

$$\therefore \text{The domain of } f = \mathbb{R} - \{3, -3, 1\}$$

$$\therefore f(x) = \frac{2}{x+3} + \frac{8}{(x+3)(x-1)} = \frac{2(x-1)+8}{(x+3)(x-1)} = \frac{2x-2+8}{(x+3)(x-1)} = \frac{2x+6}{(x+3)(x-1)} = \frac{2(x+3)}{(x+3)(x-1)} = \frac{2}{x-1}$$

$$[b] \therefore 2y = x - 5$$

$$\therefore x = 2y + 5 \quad (1)$$

$$\therefore 4x = 2 - y \quad (2)$$

By substitution from (1) in (2) :

$$\therefore 4(2y+5) = 2 - y \quad \therefore 8y + 20 = 2 - y$$

$$\therefore 9y = -18 \quad \therefore y = -2$$

By substitution in (1) : $\therefore x = 1$

$$\therefore \text{The S.S.} = \{(1, -2)\}$$

Fourth Questions :

- [a] $\because x^2 - 2x - 4 = 0$
 $\therefore a = 1, b = -2, c = -4$
 $\therefore x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times -4}}{2 \times 1} = \frac{2 \pm 2\sqrt{5}}{2} = 1 \pm \sqrt{5}$
 $\therefore x \approx 3.24$ or $x \approx -1.24$
 $\therefore$ The S.S. = $\{3.24, -1.24\}$
- [b] (1) $P(\bar{A}) = 1 - P(A) = 1 - 0.6 = 0.4$
 (2) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 $= 0.6 + 0.5 - 0.3 = 0.8$
 (3) $P(B - A) = P(B) - P(A \cap B) = 0.5 - 0.3 = 0.2$

Fifth Questions :

- [a] $\because n_1(x) = \frac{2x}{2(x+2)}$
 $\therefore$ The domain of $n_1 = \mathbb{R} - \{-2\}$ } (1)
 $\therefore n_1(x) = \frac{x}{x+2}$
 $\therefore n_2(x) = \frac{x(x+2)}{(x+2)^2}$
 $\therefore$ The domain of $n_2 = \mathbb{R} - \{-2\}$ } (2)
 $\therefore n_2(x) = \frac{x}{x+2}$

From (1) and (2) : $\therefore n_1 = n_2$

- [b] (1) d (2) b (3) c

15

Beni Suef

First Questions :

- (1) b (2) a (3) c
 (4) b (5) c (6) d

Second Questions :

- [a] (1) d (2) a (3) b
- [b] $\because y - x = 2$ $\therefore y = 2 + x$ (1)
 $\because x^2 + xy - 4 = 0$ (2)
 By substitution from (1) in (2) :
 $\therefore x^2 + x(x+2) - 4 = 0$
 $\therefore x^2 + x^2 + 2x - 4 = 0 \therefore 2x^2 + 2x - 4 = 0$
 $\therefore x^2 + x - 2 = 0 \therefore (x+2)(x-1) = 0$
 $\therefore x = -2$ or $x = 1$
 By substitution in (1) :
 $\therefore y = 0$ or $y = 3$
 $\therefore$ The S.S. = $\{(-2, 0), (1, 3)\}$

Third Questions :

- [a] $\because n(x) = \frac{x-2}{(x-2)(x+2)} + \frac{2(x+3)}{(x+3)(x+2)}$
 $\therefore$ The domain of $n = \mathbb{R} - \{2, -2, -3\}$
 $\therefore n(x) = \frac{1}{x+2} + \frac{2}{x+2} = \frac{3}{x+2}$
- [b] $\because x = 3y + 7$ (1)
 $x + 2y = 12$ (2)
 By substitution from (1) in (2) :
 $\therefore 3y + 7 + 2y = 12 \therefore 5y = 5$
 $\therefore y = 1$
 By substitution in (1) : $\therefore x = 10$
 $\therefore$ The S.S. = $\{(10, 1)\}$

Fourth Questions :

- [a] $\because n(x) = \frac{(x+7)^2}{(x-2)(x^2+2x+4)} \div \frac{x+7}{x-2}$
 $\therefore$ The domain of $n = \mathbb{R} - \{2, -7\}$
 $\therefore n(x) = \frac{(x+7)^2}{(x-2)(x^2+2x+4)} \times \frac{x-2}{x+7}$
 $= \frac{x+7}{x^2+2x+4}$
 $\therefore n(-1) = \frac{-1+7}{(-1)^2+2(-1)+4} = \frac{6}{3} = 2$
- [b] $\because x^2 + 2x - 5 = 0$
 $\therefore a = 1, b = 2, c = -5$
 $\therefore x = \frac{-2 \pm \sqrt{(2)^2 - 4 \times 1 \times -5}}{2 \times 1} = \frac{-2 \pm 2\sqrt{6}}{2}$
 $= -1 \pm \sqrt{6}$
 $\therefore x \approx 1.45$ or $x \approx -3.45$
 $\therefore$ The S.S. = $\{1.45, -3.45\}$

Fifth Questions :

- [a] $\because n_1(x) = \frac{3}{x-1} - \frac{2}{x-1}$
 $\therefore$ The domain of $n_1 = \mathbb{R} - \{1\}$
 $\therefore n_1(x) = \frac{1}{x-1}$
 $\therefore n_2(x) = \frac{x^2}{x^2(x-1)}$
 $\therefore$ The domain of $n_2 = \mathbb{R} - \{0, 1\}$
 $\therefore n_2(x) = \frac{1}{x-1}$
 $\therefore n_1(x) = n_2(x)$ for all values of $x \in \mathbb{R} - \{0, 1\}$
- [b] $P(\bar{A}) = 1 - P(A) = 1 - 0.7 = 0.3$
 $\therefore P(A - B) = P(A) - P(A \cap B)$

$$\therefore 0.5 = 0.7 - P(A \cap B)$$

$$\therefore P(A \cap B) = 0.7 - 0.5 = 0.2$$

16

Assiut

First Questions :

- (1) c (2) c (3) d
(4) c (5) b (6) c

Second Questions :

- [a] (1) b (2) c (3) b

[b] $\therefore x = 3$ (1)

$\therefore x^2 + y^2 = 25$ (2)

By substitution from (1) in (2) :

$\therefore 9 + y^2 = 25 \quad \therefore y^2 = 16$

$\therefore y = 4 \text{ or } y = -4$

$\therefore \text{The S.S.} = \{(3, 4), (3, -4)\}$

Third Questions :

[a] $\therefore n(x) = \frac{x(x+1)}{(x-1)(x+1)} - \frac{x-5}{(x-5)(x-1)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{1, -1, 5\}$

$\therefore n(x) = \frac{x}{x-1} - \frac{1}{x-1} = \frac{x-1}{x-1} = 1$

[b] $\therefore 2x + y = 10$ (1)

$\therefore x - y = 2$ (2)

By adding (1) and (2) :

$\therefore 3x = 12 \quad \therefore x = 4$

By substitution in (2) : $\therefore y = 2$

$\therefore \text{The S.S.} = \{(4, 2)\}$

Fourth Questions :

[a] $\therefore n(x) = \frac{(x-3)(x^2+3x+9)}{(x-3)(x-2)} \div \frac{x^2+x+9}{x-2}$

$\therefore \text{The domain of } n = \mathbb{R} - \{3, 2\}$

$\therefore n(x) = \frac{x^2+3x+9}{x-2} \times \frac{x-2}{x^2+3x+9} = 1$

[b] $\therefore x^2 + 3x - 1 = 0$

$\therefore a = 1, b = 3, c = -1$

$\therefore x = \frac{-3 \pm \sqrt{(3)^2 - 4 \times 1 \times -1}}{2 \times 1} = \frac{-3 \pm \sqrt{13}}{2}$

$\therefore x = 0.3 \text{ or } x = -3.3$

$\therefore \text{The S.S.} = \{0.3, -3.3\}$

Fifth Questions :

[a] $\therefore n_1(x) = \frac{1}{x}$
 $\therefore \text{The domain of } n_1 = \mathbb{R} - \{0\}$ (1)

$\therefore n_2(x) = \frac{x^2+4}{x(x^2+4)}$

$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0\}$ (2)

$\therefore n_2(x) = \frac{1}{x}$

From (1) and (2) : $\therefore n_1 = n_2$

[b] (1) $P(A) = 1 - P(\bar{A}) = 1 - 0.6 = 0.4$

(2) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 $= 0.4 + 0.5 - 0.2 = 0.7$

(3) $P(B - A) = P(B) - P(A \cap B) = 0.5 - 0.2 = 0.3$

17

Souhag

First Group :

- [1] b [2] a [3] b [4] c [5] d
[6] b [7] b [8] c [9] d

Second Group :

[10] $\therefore x - y = 4$ (multiplying by 2)

$\therefore 2x - 2y = 8$ (1)

$\therefore 3x + 2y = 7$ (2)

By adding (1) and (2) : $\therefore 5x = 15 \quad \therefore x = 3$

By substitution in (1) : $\therefore y = -1$

$\therefore \text{The S.S.} = \{(3, -1)\}$

[11] (1) $\therefore n(x) = \frac{x+1}{(x+1)(x-2)} \times \frac{(x+5)(x-2)}{(x+5)(3x+1)}$

$\therefore \text{The domain of } n = \mathbb{R} - \{-1, 2, -5, \frac{-1}{3}\}$

$\therefore n(x) = \frac{1}{3x+1}$

(2) $n(0) = \frac{1}{3 \times 0 + 1} = 1$

$\therefore n(-1)$ is undefined because $-1 \notin \text{the domain of } n$

[12] (1) The probability of occurrence one of the two events at least

$= P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 $= 0.6 + 0.5 - 0.3 = 0.8$

(2) $P(B - A) = P(B) - P(A \cap B) = 0.5 - 0.3 = 0.2$

(3) $P(\bar{A}) = 1 - P(A) = 1 - 0.6 = 0.4$

$$[13] \because a = 1, b = -6, c = 4$$

$$\therefore x = \frac{6 \pm \sqrt{(-6)^2 - 4 \times 1 \times (4)}}{2 \times 1} = \frac{6 \pm 2\sqrt{5}}{2} = 3 \pm \sqrt{5}$$

$$\therefore x \approx 5.24 \text{ or } x \approx 0.76$$

$$\therefore \text{The S.S.} = \{5.24, 0.76\}$$

$$[14] \because n(x) = \frac{x^2 + 2x + 4}{(x-2)(x^2 + 2x + 4)} + \frac{(x-3)(x+3)}{(x-2)(x+3)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -3\}$$

$$, n(x) = \frac{1}{x-2} + \frac{x-3}{x-2} = \frac{x-2}{x-2} = 1$$

$$[15] \because x - y = 2 \quad \therefore x = y + 2 \quad (1)$$

$$, \because x^2 + y^2 = 10 \quad (2)$$

By substitution from (1) in (2) :

$$\therefore (y+2)^2 + y^2 = 10$$

$$\therefore y^2 + 4y + 4 + y^2 = 10$$

$$\therefore 2y^2 + 4y - 6 = 0$$

$$\therefore y^2 + 2y - 3 = 0$$

$$\therefore (y+3)(y-1) = 0$$

$$\therefore y = -3 \text{ or } y = 1$$

By substitution in (1) :

$$\therefore x = -1 \text{ or } x = 3$$

$$\therefore \text{The S.S.} = \{(-1, -3), (3, 1)\}$$

$$[16] (1) \because n(x) = \frac{x(x-2)}{(x-2)(x^2+2)}$$

$$\therefore n^{-1}(x) = \frac{(x-2)(x^2+2)}{x(x-2)}$$

$$\therefore \text{The domain of } n^{-1} = \mathbb{R} - \{0, 2\}$$

$$, n^{-1}(x) = \frac{x^2+2}{x}$$

$$(2) \because n^{-1}(x) = 3 \quad \therefore \frac{x^2+2}{x} = 3$$

$$\therefore x^2 + 2 = 3x \quad \therefore x^2 - 3x + 2 = 0$$

$$\therefore (x-2)(x-1) = 0$$

$$\therefore x = 1 \text{ or } x = 2 \text{ (refused)}$$

18

Qena

First Questions :

$$[a] (1) c \quad (2) c \quad (3) b$$

$$[b] P(B-A) = P(B) - P(A \cap B) = 0.7 - 0.4 = 0.3$$

Second Questions :

$$[a] (1) d \quad (2) c \quad (3) b$$

$$[b] \because n(x) = \frac{(x-2)(x^2+2x+4)}{(x-2)(x+3)} \div \frac{x^2+2x+4}{3(x+3)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \{2, -3\}$$

$$, n(x) = \frac{x^2+2x+4}{x+3} \times \frac{3(x+3)}{x^2+2x+4} = 3$$

Third Questions :

$$[a] (1) c \quad (2) a \quad (3) d$$

$$[b] \because n_1(x) = \frac{x(x-1)}{x^2(x-2)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{0, 2\} \quad \left. \vphantom{\frac{x(x-1)}{x^2(x-2)}} \right\} (1)$$

$$, n_1(x) = \frac{x-1}{x(x-2)}$$

$$, \because n_2(x) = \frac{(x-2)(x-1)}{x(x-2)^2}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{0, 2\} \quad \left. \vphantom{\frac{(x-2)(x-1)}{x(x-2)^2}} \right\} (2)$$

$$, n_2 = \frac{x-1}{x(x-2)}$$

$$\text{From (1), (2) : } \therefore n_1 = n_2$$

Fourth Questions :

$$[a] \because a = 2, b = 5, c = -1$$

$$\therefore x = \frac{-5 \pm \sqrt{(5)^2 - 4 \times 2 \times (-1)}}{2 \times 2} = \frac{-5 \pm \sqrt{33}}{4}$$

$$= \frac{-5 \pm 5.74}{4}$$

$$\therefore x = 0.185 \text{ or } x = -2.685$$

$$\therefore \text{The S.S.} = \{0.185, -2.685\}$$

$$[b] \because xy = 3 \quad (1)$$

$$, x + y = 4$$

$$\therefore y = 4 - x \quad (2)$$

By substitution from (2) in (1) :

$$\therefore x(4-x) = 3 \quad \therefore 4x - x^2 = 3$$

$$\therefore x^2 - 4x + 3 = 0 \quad \therefore (x-1)(x-3) = 0$$

$$\therefore x = 1 \text{ or } x = 3$$

By substituting in (2) :

$$\therefore y = 3 \text{ or } y = 1$$

$$\therefore \text{The S.S.} = \{(1, 3), (3, 1)\}$$

Fifth Questions :

$$[a] \because \frac{x}{4-x^2} = \frac{x}{(2-x)(2+x)}$$

$$\therefore \text{The domain of first fraction} = \mathbb{R} - \{2, -2\}$$

$$\therefore \text{The second fraction is } \frac{5}{x+2}$$

$$\therefore \text{The domain of the second fraction} = \mathbb{R} - \{-2\}$$

$$\therefore \text{The common denominator} = \mathbb{R} - \{2, -2\}$$

- [b] Let the measures of the two angles be x and y
 $\therefore x + y = 180^\circ$ (1)
 $\therefore x = 4y$ (2)
 By substitution from (2) in (1):
 $\therefore 4y + y = 180 \quad \therefore 5y = 180$
 $\therefore y = 36$
 By substituting in (2): $\therefore x = 144$
 $\therefore$ The measures of the two angles are 36° and 144°

19

Luxor

First Group :

- [1] b [2] d [3] c [4] c [5] a
 [6] b [7] d [8] c [9] c

Second Group :

- [10] $\therefore n(x) = \frac{x(x-1)}{(x-1)(x-2)}$
 $\therefore n^{-1}(x) = \frac{(x-1)(x-2)}{x(x-1)}$
 $\therefore$ The domain of $n^{-1}(x) = \mathbb{R} - \{0, 1, 2\}$
 $\therefore n^{-1}(x) = \frac{x-2}{x}$
 [11] $\therefore a = 1, b = -4, c = 2$
 $\therefore x = \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 2}}{2 \times 1} = \frac{4 \pm 2\sqrt{2}}{2} = 2 \pm \sqrt{2}$
 $\therefore x \approx 3.41$ or $x \approx 0.59$
 [12] $\therefore n(x) = \frac{(x-2)(x-5)}{(x-1)(x-5)} \div x(x-2)$
 $\therefore$ The domain of $n = \mathbb{R} - \{1, 5, 0, 2\}$
 $\therefore n(x) = \frac{x-2}{x-1} \times \frac{1}{x(x-2)} = \frac{1}{x(x-1)}$
 [13] Let the length of the rectangle be x cm. and its width = y cm.
 $\therefore x - y = 2$ (1)
 $\therefore 2(x + y) = 28$ (2)
 $\therefore x + y = 14$
 By adding (1) and (2):
 $\therefore 2x = 16 \quad \therefore x = 8$
 By substituting in (1): $\therefore y = 6$
 $\therefore$ The length of the rectangle = 8 cm.
 $\therefore$ its width = 6 cm.
 $\therefore$ The area of the rectangle = $8 \times 6 = 48 \text{ cm}^2$

- [14] $\therefore x - y = 3 \quad \therefore x = y + 3$ (1)
 $\therefore xy = 10$ (2)

By substitution from (1) in (2):

$$\therefore (y+3) \times y = 10 \quad \therefore y^2 + 3y - 10 = 0$$

$$\therefore (y+5)(y-2) = 0 \quad \therefore y = -5, y = 2$$

By substitution in (1):

$$\therefore x = -2 \text{ or } x = 5$$

$$\therefore \text{The S.S.} = \{(-2, -5), (5, 2)\}$$

- [15] (1) $\therefore$ The two events are mutually exclusive

$$\therefore P(A \cap B) = 0$$

$$\therefore P(A \cup B) = P(A) + P(B) = \frac{2}{5} + \frac{1}{3} = \frac{11}{15}$$

$$(2) P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{2}{5} + \frac{1}{3} - \frac{1}{15} = \frac{2}{3}$$

$$[16] \therefore n_1(x) = \frac{5(x^2+2)}{(x^2+2)(x+1)}$$

$$\therefore \text{The domain of } n_1 = \mathbb{R} - \{-1\} \quad (1)$$

$$\therefore n_1(x) = \frac{5x}{x+1}$$

$$\therefore n_2(x) = \frac{5x}{x+1}$$

$$\therefore \text{The domain of } n_2 = \mathbb{R} - \{-1\} \quad (2)$$

$$\text{From (1) and (2): } \therefore n_1 = n_2$$

20

Aswan

First Group :

- [1] b [2] c [3] c [4] c [5] d
 [6] a [7] c [8] d [9] d

Second Group :

$$[10] \therefore x = y \quad (1)$$

$$\therefore x^2 + y^2 = 50 \quad (2)$$

By substitution from (1) in (2):

$$\therefore x^2 + x^2 = 50 \quad \therefore 2x^2 = 50$$

$$\therefore x^2 = 25 \quad \therefore x = 5 \text{ or } x = -5$$

By substituting in (1):

$$\therefore y = 5 \text{ or } y = -5$$

$$\therefore \text{The S.S.} = \{(5, 5), (-5, -5)\}$$

$$\boxed{11} \because n_1(x) = \frac{x}{(x-2)(x+2)} \quad \left. \begin{array}{l} \therefore \text{The domain of } n_1 = \mathbb{R} - \{2, -2\} \end{array} \right\} (1)$$

$$\because n_2(x) = \frac{2x}{2(x-2)(x+2)} \\ \therefore \text{The domain of } n_2 = \mathbb{R} - \{2, -2\} \quad \left. \begin{array}{l} n_2(x) = \frac{x}{(x-2)(x+2)} \end{array} \right\} (2)$$

From (1) and (2) : $\therefore n_1 = n_2$

$$\boxed{12} \because A \text{ and } B \text{ are two mutually exclusive events}$$

$$\therefore P(A \cup B) = P(A) + P(B)$$

$$\therefore \frac{7}{12} = \frac{1}{3} + P(B)$$

$$\therefore P(B) = \frac{7}{12} - \frac{1}{3} = \frac{1}{4}$$

$$\boxed{13} \because 3x^2 - 5x + 1 = 0$$

$$\therefore a = 3, \quad b = -5, \quad c = 1$$

$$\therefore x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times 1}}{2 \times 3} = \frac{5 \pm \sqrt{13}}{6}$$

$$\therefore x \approx 1.43 \text{ or } x \approx 0.23$$

$$\therefore \text{The S.S.} = \{1.43, 0.23\}$$

$$\boxed{14} \because n(x) = \frac{x^2}{x(x+2)} + \frac{2(x-2)}{(x-2)(x+2)} \\ \therefore \text{The domain of } n = \mathbb{R} - \{0, -2, 2\}$$

$$\therefore n(x) = \frac{x}{x+2} + \frac{2}{x+2} = \frac{x+2}{x+2} = 1$$

$$\boxed{15} \because 3x + y = 7 \quad (1)$$

$$\therefore x + y = 3 \text{ (multiply by } -1)$$

$$\therefore -x - y = -3 \quad (2)$$

By Adding (1) and (2) :

$$\therefore 2x = 4 \quad \therefore x = 2$$

By substituting in (1) : $\therefore y = 1$

$$\therefore \text{The S.S.} = \{(2, 1)\}$$

$$\boxed{16} \because n(x) = \frac{x+1}{(x+1)(x-2)} \times \frac{(x-2)(x+5)}{(3x+1)(x+5)}$$

$$\therefore \text{The domain of } n = \mathbb{R} - \left\{-1, 2, -\frac{1}{3}, -5\right\}$$

$$\therefore n(x) = \frac{1}{3x+1}$$

Answers of school book examinations on geometry

Model 1

1

1 d 2 a 3 d 4 a 5 b 6 a

2

[a] supplementary, theoretical.

[b] $\because \overline{XY} \parallel \overline{BD}$, $\overline{AB}$ is a transversal

$\therefore m(\angle DBX) = m(\angle BXY)$ (alternate angles) (1)

$\because m(\angle C)$ (inscribed) $= m(\angle ABD)$ (tangency) (2)

From (1) and (2) $\therefore m(\angle C) = m(\angle BXY)$

$\therefore$ AXYC is a cyclic quadrilateral. (Q.E.D.)

3

[a] $\because \overline{AB}$, $\overline{AC}$ are two tangents to the smaller circle

$\therefore AB = AC \quad \therefore 2x - 3 = 15$

$\therefore 2x = 18 \quad \therefore x = 9$

$\because \overline{AB}$, $\overline{AD}$ are two tangents to the greater circle

$\therefore AB = AD \quad \therefore y - 2 = 15 \quad \therefore y = 17$

[b] $\because m(\angle BDC) = m(\angle BAC)$

(two inscribed angles subtended by $\widehat{BC}$)

$\therefore m(\angle BDC) = 30^\circ$

$\therefore m(\widehat{BC}) = 2m(\angle BAC) = 60^\circ$

$\because \overline{AB}$ is a diameter in the circle M

$\therefore m(\widehat{AB}) = 180^\circ$

$\therefore m(\widehat{AC}) = 180^\circ - 60^\circ = 120^\circ$

$\because D$ is the midpoint of $\widehat{AC}$

$\therefore m(\widehat{AD}) = \frac{120^\circ}{2} = 60^\circ$ (First req.)

$\therefore m(\angle ACD) = \frac{1}{2} m(\widehat{AD}) = \frac{1}{2} \times 60^\circ = 30^\circ$

$\therefore m(\angle CAB) = m(\angle ACD)$ but they are alternate

$\therefore \overline{AB} \parallel \overline{DC}$ (Second req.)

4

[a] $\because X$ is the midpoint of $\overline{AB}$

$\therefore \overline{MX} \perp \overline{AB} \quad \therefore m(\angle MXA) = 90^\circ$

$\because Y$ is the midpoint of $\overline{AC}$

$\therefore \overline{MY} \perp \overline{AC} \quad \therefore m(\angle MYA) = 90^\circ$

From the quadrilateral AXMY :

$\therefore m(\angle DMH) = 360^\circ - (90^\circ + 90^\circ + 70^\circ) = 110^\circ$
(First req.)

$\because AB = AC$, $\overline{MX} \perp \overline{AB}$, $\overline{MY} \perp \overline{AC}$

$\therefore MX = MY \quad \because MD = MH = r$

By subtracting $\therefore XD = YH$ (Second req.)

[b] $\because m(\angle A) = \frac{1}{2} [m(\widehat{BC}) - m(\widehat{BD})]$

$\therefore 30^\circ = \frac{1}{2} [120^\circ - m(\widehat{BD})]$

$\therefore 60^\circ = 120^\circ - m(\widehat{BD}) \quad \therefore m(\widehat{BD}) = 120^\circ - 60^\circ$

$\therefore m(\widehat{BD}) = 60^\circ$ (First req.)

$\because m(\widehat{BC}) = m(\widehat{DH}) \quad \therefore BC = DH$

by adding $m(\widehat{BD})$ to both sides

$\therefore m(\widehat{CD}) = m(\widehat{HB}) \quad \therefore m(\angle C) = m(\angle H)$

In $\triangle ACH$ $\therefore AC = AH$, $\therefore BC = DH$

By subtracting $\therefore AB = AD$ (Second req.)

5

[a] $\because \overline{DA}$ and $\overline{DB}$ are two tangent-segments to the circle M at A and B

$\therefore DA = DB$

$\therefore m(\angle 1) = m(\angle 2)$

$\therefore m(\angle D)$

$= 180^\circ - 2m(\angle 1)$ (1)

In $\triangle ABC$ $\because AB = AC$

$\therefore m(\angle 3) = m(\angle 4)$

$\therefore m(\angle BAC) = 180^\circ - 2m(\angle 4)$ (2)

$\because \overline{AD}$ is a tangent-segment to the circle

$\therefore m(\angle 4)$ (inscribed) $= m(\angle 1)$ (tangency) (3)

From (1), (2) and (3) $\therefore m(\angle BAC) = m(\angle D)$

$\therefore \overline{AC}$ is a tangent to the circle passing through the vertices of the $\triangle ABD$ (Q.E.D.)

[b] In $\triangle AMB$ $\because AM = BM = r$

$\therefore m(\angle MBA) = m(\angle MAB) = 20^\circ$

$\because C$ is the midpoint of $\overline{AB}$

$\therefore \overline{MC} \perp \overline{AB} \quad \therefore m(\angle MCB) = 90^\circ$

In $\triangle BCM$ $\therefore m(\angle BMC) = 180^\circ - (90^\circ + 20^\circ) = 70^\circ$

$\therefore m(\angle BHD) = \frac{1}{2} m(\angle BMD)$

(inscribed and central angles subtended by $\widehat{BD}$)

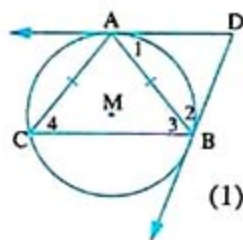
$\therefore m(\angle BHD) = \frac{1}{2} \times 70^\circ = 35^\circ$ (First req.)

In $\triangle AMB$ $\because AM = BM = r$

$\therefore m(\angle MAB) = m(\angle MBA) = 20^\circ$

$\therefore m(\angle AMB) = 180^\circ - (20^\circ + 20^\circ) = 140^\circ$

$\therefore m(\widehat{ADB}) = m(\angle AMB) = 140^\circ$ (Second req.)



Model 2

1

- | | | |
|-----|-----|-----|
| 1 b | 2 d | 3 b |
| 4 c | 5 d | 6 b |

2

- [a] $\because AB = AC$
 $\therefore \overline{MD} \perp \overline{AB}, \overline{ME} \perp \overline{AC}$
 $\therefore MD = ME, \because MX = MY = r$
 $\therefore DX = EY$ (Q.E.D.)
- [b] In $\triangle ABD : \because AB = AD$
 $\therefore m(\angle ABD) = m(\angle ADB) = 30^\circ$
 $\therefore m(\angle A) = 180^\circ - 2 \times 30^\circ = 120^\circ$
 $\therefore m(\angle A) + m(\angle C) = 120^\circ + 60^\circ = 180^\circ$
 $\therefore ABCD$ is a cyclic quadrilateral. (Q.E.D.)

3

- [a] State by yourself.
- [b] $\because E$ is the midpoint of $\widehat{BF}$
 $\therefore m(\widehat{FE}) = m(\widehat{BE})$
 $\therefore m(\angle FAE) = m(\angle BAE)$
 $\therefore m(\angle CBE)$ (tangency) $= m(\angle BAE)$
 (inscribed)
 $\therefore m(\angle DAC) = m(\angle DBC)$
 and they are drawn on $\overline{DC}$ and on one side of it
 $\therefore ABCD$ is a cyclic quadrilateral.

4

- [a] $\because \overline{AD}, \overline{AF}$ are two tangent-segments to the circle
 $\therefore AD = AF = 5$ cm.
 $\because \overline{BD}, \overline{BE}$ are two tangent-segments to the circle
 $\therefore BD = BE = 4$ cm.
 $\because \overline{CE}, \overline{CF}$ are two tangent-segments to the circle
 $\therefore CE = CF = 3$ cm.
 $\therefore$ The perimeter of $\triangle ABC = 5 + 5 + 4 + 4 + 3 + 3$
 $= 24$ cm. (The req.)
- [b] $\because \overline{AF} \parallel \overline{DE}, \overline{AB}$ is a transversal
 $\therefore m(\angle AED) = m(\angle EAF)$ (alternate angles)
 $\therefore m(\angle C)$ (inscribed) $= m(\angle BAF)$ (tangency)
 $\therefore m(\angle C) = m(\angle AED)$
 $\therefore DEBC$ is a cyclic quadrilateral. (Q.E.D.)

5

- $\because BCDE$ is a cyclic quadrilateral
 $\therefore m(\angle CBE) + m(\angle D) = 180^\circ$
 $\therefore m(\angle CBE) = 180^\circ - 125^\circ = 55^\circ$
 $\therefore \overline{AB}, \overline{AC}$ are two tangents to the circle
 $\therefore AB = AC$
 $\therefore$ In $\triangle ABC : m(\angle ACB) = m(\angle ABC)$
 $= \frac{180^\circ - 70^\circ}{2} = 55^\circ$
 $\therefore m(\angle CBE) = m(\angle ACB) = 55^\circ$
 and they are alternate angles
 $\therefore \overline{AC} \parallel \overline{BE}$
 $\therefore m(\angle BEC)$ (inscribed)
 $= m(\angle ACB)$ (tangency) $= 55^\circ$
 $\therefore m(\angle CBE) = m(\angle BEC) = 55^\circ$
 $\therefore$ In $\triangle CBE : CB = CE$

Model examination for the merge students

1

- | | |
|------------|-------------------------------|
| 1 diameter | 2 perpendicular to this chord |
| 3 equal | 4 3 |
| 5 infinite | 6 180° |

2

- | | | |
|-----|-----|-----|
| 1 a | 2 a | 3 d |
| 4 c | 5 d | 6 c |

3

- | | | |
|-----|-----|-----|
| 1 X | 2 ✓ | 3 X |
| 4 ✓ | 5 X | 6 X |

4

- | | | |
|-------|--------|---------|
| 1 90° | 2 130° | 3 40° |
| 4 5 | 5 30° | 6 2 : 1 |

Answers of governorates' examinations of geometry

1

Cairo

First Group :

- 1 b 2 b 3 a 4 a 5 d
6 c 7 b 8 d 9 b

Second Group :

- [10]** $\therefore m(\angle BAC) = \frac{1}{2} m(\widehat{BC}) = \frac{1}{2} \times 120^\circ = 60^\circ$
 $\therefore m(\angle ACB) = 180^\circ - (70^\circ + 60^\circ) = 50^\circ$
 $\therefore m(\angle BAD)$ (tangency)
 $= m(\angle ACB)$ (inscribed) $= 50^\circ$ (The req.)
- [11]** $\therefore ABCD$ is a cyclic quod.
 $\therefore m(\angle ADC) = m(\angle CBE) = 60^\circ$ (First req.)
 In $\triangle ACD$:
 $\therefore DC = DA$, $m(\angle ADC) = 60^\circ$
 $\therefore \triangle ACD$ is an equilateral triangle. (Second req.)
- [12]** $\therefore \overline{AB}, \overline{AC}$ are two tangent segments to the circle M at B, C
 $\therefore AB = AC$ (1)
 $\therefore \overline{AD}, \overline{AE}$ are two tangent segments to the circle N at D, E
 $\therefore AD = AE$ (2)
 By subtracting (2) from (1) :
 $\therefore DB = EC = 5$ cm. (First req.)
 $\therefore AB = AC = 9$ cm.
 $\therefore$ The perimeter of $ABCD$
 $= 9 + 9 + 4 + 4 = 26$ cm. (Second req.)
- [13]** $m(\angle AMC) = 2 m(\angle ABC) = 80^\circ$ (First req.)
 In $\triangle AMC$:
 $\therefore AM = CM = r$
 $\therefore m(\angle ACM) = m(\angle CAM) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$ (Second req.)
- [14]** $\therefore \overline{AC}$ is a diameter in circle M
 $\therefore \overline{AB}$ is a tangent segment
 $\therefore \overline{AC} \perp \overline{AB}$ $\therefore m(\angle MAB) = 90^\circ$
 $\therefore m(\angle MAB) + m(\angle MEB) = 90^\circ + 90^\circ = 180^\circ$

$\therefore ABEM$ is a cyclic quadrilateral. (First req.)

$\therefore \overline{ME} \perp \overline{DC}$

$\therefore E$ is the midpoint of $\overline{DC}$

$\therefore DE = \frac{1}{2} DC = 3.5$ cm. (Second req.)

[15] (1) $\therefore r_1 + r_2 = 10 + 5 = 15$ cm.

$\therefore MN > r_1 + r_2$

$\therefore$ The two circles are distant

(2) $\therefore r_1 - r_2 = 10 - 5 = 5$ cm.

$\therefore MN < r_1 - r_2$

$\therefore$ One of the two circles is inside the other

[16] $m(\angle AMB) = m(\widehat{AB}) = 60^\circ$ (First req.)

$\therefore$ The length of $\widehat{AB} = \frac{60^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 21$
 $= 22$ cm. (Second req.)

2

Giza

First Group :

- 1 a 2 c 3 c 4 b 5 b
6 b 7 c 8 b 9 d

Second Group :

- [10]** In $\triangle MBC$:
 $\therefore MB = MC = r$
 $\therefore m(\angle MBC) = m(\angle MCB) = 20^\circ$
 $\therefore m(\angle BMC) = 180^\circ - (20^\circ + 20^\circ) = 140^\circ$
 $\therefore m(\angle BAC) = \frac{1}{2} m(\angle BMC) = \frac{1}{2} \times 140 = 70^\circ$
 (inscribed and central angles subtended by the same arc $\widehat{BC}$) (The req.)
- [11]** $\therefore ABCD$ is a cyclic quad
 $\therefore m(\angle ADC) = m(\angle ABE) = 110^\circ$
 In $\triangle ACD$:
 $\therefore m(\angle CAD) = 180^\circ - (110^\circ + 35^\circ) = 35^\circ$
 $\therefore m(\angle ACD) = m(\angle CAD)$
 $\therefore m(\widehat{AD}) = m(\widehat{CD})$ (Q.E.D.)
- [12]** $\therefore \overline{MD} \perp \overline{AB}$ $\therefore m(\angle ADM) = 90^\circ$
 $\therefore E$ is a midpoint of $\overline{AC}$
 $\therefore \overline{ME} \perp \overline{AC}$ $\therefore m(\angle AEM) = 90^\circ$
 From the quadrilateral $ADME$
 $\therefore m(\angle EMD) = 360^\circ - (46^\circ + 90^\circ + 90^\circ)$
 $= 134^\circ$ (First req.)

$\therefore AB = AC \quad \therefore MD = ME = 6 \text{ cm.}$
 $\therefore MX = 6 + 8 = 14 \text{ cm.}$
 $\therefore$ The circumference of the circle
 $= 2 \times \frac{22}{7} \times 14 = 88 \text{ cm.}$ (Second req.)

[13] $\therefore m(\widehat{BD}) = 2m(\angle BAD) = 2 \times 22^\circ = 44^\circ$
 $\therefore m(\angle E) = \frac{1}{2} [m(\widehat{AC}) - m(\widehat{BD})]$
 $\therefore 30^\circ = \frac{1}{2} [m(\widehat{AC}) - 44^\circ]$
 $\therefore 60^\circ = m(\widehat{AC}) - 44^\circ$
 $\therefore m(\widehat{AC}) = 60^\circ + 44^\circ = 104^\circ$ (The req.)

[14] $\therefore \overline{AB}, \overline{AC}$ are tangent segments to the circle M
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 40^\circ}{2} = 70^\circ$
 $\therefore \overline{AC} \parallel \overline{BD}, \overline{BC}$ is a transversal.
 $\therefore m(\angle ACB) = m(\angle CBD)$ (alternate angles)
 $\therefore m(\angle ABC) = m(\angle CBD) = 70^\circ$
 $\therefore \overline{BC}$ bisects $\angle ABD$ (First req.)
 $\therefore m(\angle CMD) = 2m(\angle CBD) = 2 \times 70^\circ = 140^\circ$
 (central and inscribed angles subtended by the same arc $\widehat{CD}$) (Second req.)

[15] $\therefore \angle AED$ is an exterior angle of $\triangle ABE$
 $\therefore m(\angle ABE) = 110^\circ - 65^\circ = 45^\circ$
 $\therefore m(\angle ABD) = m(\angle ACD)$ and they are drawn on $\overline{AD}$ and on one side of it
 $\therefore ABCD$ is a cyclic quadrilateral. (Q.E.D.)

[16] $\therefore \overline{XY} \parallel \overline{BC}, \overline{AC}$ is a transversal
 $\therefore m(\angle AXY) = m(\angle ACB)$
 (corresponding angles)
 $\therefore \overline{AD}$ is a tangent to the circle M
 $\therefore m(\angle BAD)$ (tangency) $= m(\angle ACB)$ (inscribed)
 $\therefore m(\angle XAD) = m(\angle AXY)$
 $\therefore \overline{AD}$ is a tangent to the circle passes through A, X, Y (Q.E.D.)

3

Alexandria

[1] a [2] d [3] b

[4] $\therefore \overline{AX}, \overline{AZ}$ are two tangent-segments to the circle M
 $\therefore AX = AZ = 5 \text{ cm.}$
 $\therefore \overline{BX}, \overline{BY}$ are two tangent segment to the circle M
 $\therefore BX = BY = 8 \text{ cm.}$

$\therefore \overline{CY}, \overline{CZ}$ are two tangent segments to the circle M

$\therefore CY = CZ = 7 \text{ cm.}$

$\therefore$ The perimeter of $\triangle ABC$
 $= 5 + 5 + 8 + 8 + 7 + 7 = 40 \text{ cm.}$ (The req.)

[5] $\therefore D$ is a midpoint of $\overline{BC}$
 $\therefore \overline{MD} \perp \overline{BC} \quad \therefore m(\angle MDA) = 90^\circ$

$\therefore \overline{AE}$ is a tangent of the circle M
 $\therefore \overline{ME} \perp \overline{AE} \quad \therefore m(\angle MEA) = 90^\circ$

From the quadrilateral AEMD

$\therefore m(\angle EAD) = 360^\circ - (115^\circ + 90^\circ + 90^\circ)$
 $= 65^\circ$ (The req.)

[6] c

[7] d

[8] a

[9] The length of the arc $= \frac{3}{4} \times 2 \times \frac{22}{7} \times 21$
 $= 99 \text{ cm.}$ (The req.)

[10] c

[11] b

[12] a

[13] $\therefore X$ is the midpoint of $\overline{AB}$

$\therefore \overline{MX} \perp \overline{AB}$

$\therefore AB = CD, \overline{MY} \perp \overline{CD}$

$\therefore MX = MY$

$\therefore ME = MF = r$

By subtraction :

$\therefore XE = YF$

(Q.E.D.)

[14] Construction : Draw $\overline{BD}$

Proof : $\therefore AD = BC = DC$

$\therefore \overline{AB}$ is a diameter of the circle

$\therefore m(\widehat{AD}) = m(\widehat{BC}) = m(\widehat{DC}) = 60^\circ$

$\therefore m(\angle ABD) = m(\angle BDC)$ and they are alternate angles.

$\therefore \overline{DC} \parallel \overline{AB}$

(First req.)

$\therefore m(\widehat{DCB}) = 60^\circ + 60^\circ = 120^\circ$

$\therefore m(\angle DAB) = \frac{1}{2} m(\angle DCB) = \frac{1}{2} \times 120^\circ = 60^\circ$

$\therefore m(\angle EAD) = 180^\circ - 60^\circ = 120^\circ$ (Second req.)

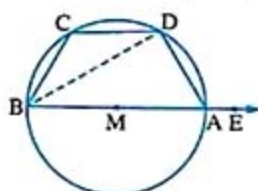
[15] In $\triangle AED$: $\therefore AE = DE$

$\therefore m(\angle DAE) = m(\angle ADE) = 35^\circ$

$\therefore m(\angle E) = 180^\circ - (35^\circ + 35^\circ) = 110^\circ$ (First req.)

$\therefore m(\angle E) = m(\angle ABC) = 110^\circ$

$\therefore ABDE$ is a cyclic quadrilateral. (Second req.)



- 16 $\because \overline{EA}, \overline{EB}$ are two tangent segments to the circle M
 $\therefore EA = EB$
 $\therefore m(\angle EAB) = m(\angle EBA) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$
 $\therefore m(\angle ADB)$ (inscribed) $= m(\angle EAB)$ (tangency)
 $= 50^\circ$
 $\therefore ABCD$ is a cyclic quad.
 $\therefore m(\angle BAD) = 180^\circ - 130^\circ = 50^\circ$
 $\therefore m(\angle BAD) = m(\angle ADB)$
 $\therefore BA = BD$ (Q.E.D. 1)
 $\therefore m(\angle EAB) = m(\angle BAD) = 50^\circ$
 $\therefore \overline{AB}$ bisects $\angle EAD$ (Q.E.D. 2)

4

El-Kalyoubia

First Group :

- 1 c 2 c 3 c 4 b 5 c
 6 a 7 c 8 c 9 d

Second Group :

10 Construction :

Draw $\overline{MD}, \overline{ME}$

Proof : $\because \overline{AB}$ is a tangent to the smaller circle at D

$$\therefore \overline{MD} \perp \overline{AB}$$

$\because \overline{AC}$ is a tangent to the smaller circle at E

$$\therefore \overline{ME} \perp \overline{AC}$$

$\because MD = ME$ (two radii in the small circle)

$$\therefore AB = AC \quad (\text{The req.})$$

11 $\because \overline{AB}$ is a tangent to the circle M

$$\therefore \overline{MB} \perp \overline{AB} \quad \therefore m(\angle ABM) = 90^\circ$$

In $\triangle ABM$:

$$\therefore m(\angle BMA) = 180^\circ - (30^\circ + 90^\circ) = 60^\circ$$

$$\therefore m(\angle BCD) = \frac{1}{2} m(\angle BMD)$$

(inscribed and central angles subtended by $\widehat{BD}$)

$$\therefore m(\angle BCA) = \frac{1}{2} \times 60^\circ = 30^\circ \quad (\text{The req.})$$

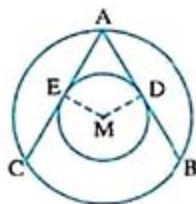
$$\begin{aligned} 12 \quad m(\angle A) &= \frac{1}{2} [m(\widehat{CE}) - m(\widehat{BD})] \\ &= \frac{1}{2} (120^\circ - 30^\circ) = 45^\circ \quad (\text{The req.}) \end{aligned}$$

13 $\because ABCD$ is a cyclic quad

$$\therefore m(\angle ADC) = m(\angle ABE) = 75^\circ$$

$$\therefore m(\angle BDC) = \frac{1}{2} m(\widehat{BC}) = \frac{1}{2} \times 120^\circ = 60^\circ$$

$$\therefore m(\angle ADB) = 75^\circ - 60^\circ = 15^\circ \quad (\text{The req.})$$



14 $\because \overline{AB}$ is a tangent segment

$$\therefore \overline{MB} \perp \overline{AB} \quad \therefore m(\angle ABM) = 90^\circ$$

$\because D$ is a midpoint of $\widehat{CE}$

$$\therefore \overline{MD} \perp \overline{CE} \quad \therefore m(\angle ADM) = 90^\circ$$

$$\therefore m(\angle ABM) + m(\angle ADM) = 90^\circ + 90^\circ = 180^\circ$$

$\therefore ABMD$ is a cyclic quadrilateral. (Q.E.D.)

15 $\because \overline{AB}, \overline{AC}$ are two tangents of the circle M

$$\therefore AB = AC$$

$$\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 40^\circ}{2} = 70^\circ$$

$\because \overline{AB}$ is a tangent to the circle

$$\therefore \overline{MB} \perp \overline{AB} \quad \therefore m(\angle ABM) = 90^\circ$$

$$\therefore m(\angle CBD) = 90^\circ - 70^\circ = 20^\circ \quad (\text{The req.})$$

$$16 \quad \therefore m(\angle BAC) = \frac{1}{2} m(\widehat{BC}) = \frac{1}{2} \times 70^\circ = 35^\circ$$

In $\triangle ABC$:

$$\therefore m(\angle ACB) = 180^\circ - (110^\circ + 35^\circ) = 35^\circ$$

$$\therefore m(\angle BAD)$$
 (tangency)

$$= m(\angle ACB)$$
 (inscribed)

$$= 35^\circ$$

(The req.)

5

El-Sharkia

First Question :

- [a] (1) d (2) a (3) b

[b] $\because X$ is the midpoint of $\overline{AB}$

$$\therefore \overline{MX} \perp \overline{AB} \quad \therefore m(\angle AXM) = 90^\circ$$

$\because Y$ is the midpoint of $\overline{AC}$

$$\therefore \overline{MY} \perp \overline{AC} \quad \therefore m(\angle AYM) = 90^\circ$$

From the quadrilateral $AXMY$

$$\therefore m(\angle DMH) = 360^\circ - (90^\circ + 90^\circ + 50^\circ) = 130^\circ \quad (\text{First req.})$$

$$\because AB = AC \quad \therefore MX = MY$$

$$\because MD = MH = r$$

$$\text{By subtraction : } \therefore DX = HY \quad (\text{Second req.})$$

Second Question :

- [a] (1) a (2) d (3) a

[b] $\because \overline{AB}$ is a diameter of the circle M

$$\therefore m(\angle ACB) = 90^\circ$$

$$\therefore m(\angle BAC) = 180^\circ - (90^\circ + 40^\circ) = 50^\circ$$

$\therefore \overline{AC} \parallel \overline{MD}$, $\overline{AB}$ is a transversal
 $\therefore m(\angle AMD) = m(\angle BAC) = 50^\circ$
 (alternating angles)
 $\therefore m(\angle ACD) = \frac{1}{2} m(\angle AMD) = \frac{1}{2} \times 50^\circ = 25^\circ$
 (inscribed and central angles subtended by the same arc $\widehat{AD}$) (Q.E.D.)

Third Question :

- [a] (1) b (2) a (3) a
 [b] $\therefore BCDE$ is a cyclic quadrilateral
 $\therefore m(\angle CBE) = 180^\circ - 125^\circ = 55^\circ$
 $\therefore \overline{AB}$, $\overline{AC}$ are two tangents to the circle
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 70^\circ}{2} = 55^\circ$
 $\therefore m(\angle ACB)$ (tangency)
 $= m(\angle BEC)$ (inscribed)
 $= 55^\circ$
 $\therefore m(\angle CBE) = m(\angle CEB)$
 $\therefore CB = CE$ (Q.E.D. 1)
 $\therefore m(\angle CBE) = m(\angle ACB) = 55^\circ$
 and they are alternate angles
 $\therefore \overline{AC} \parallel \overline{BE}$ (Q.E.D. 2)

Fourth Question :

- [a] $\therefore m(\angle AHC) = \frac{1}{2} [m(\widehat{AC}) + m(\widehat{BD})]$
 $\therefore m(\widehat{AC}) = m(\widehat{BD})$
 $\therefore m(\angle AHC) = \frac{1}{2} [m(\widehat{AC}) + m(\widehat{AC})] = m(\widehat{AC})$
 $\therefore m(\angle AMC) = m(\widehat{AC})$
 $\therefore m(\angle AHC) = m(\angle AMC)$
 and they are drawn on the same base $\overline{AC}$ and on one side it.
 $\therefore ACMH$ is a cyclic quadrilateral. (Q.E.D.)
 [b] $\therefore \overline{AB}$ is a diameter in the circle M
 $\therefore m(\angle ACB) = 90^\circ$
 $\therefore \overline{DH} \perp \overline{AB}$ $\therefore m(\angle DHA) = 90^\circ$
 $\therefore m(\angle ACB) + m(\angle DHA) = 90^\circ + 90^\circ = 180^\circ$
 $\therefore AHDC$ is a cyclic quadrilateral. (Q.E.D. 1)
 $\therefore m(\angle BDH) = m(\angle BAC)$
 $\therefore m(\angle BAC) = \frac{1}{2} m(\widehat{BC})$
 $\therefore m(\angle BDH) = \frac{1}{2} m(\widehat{BC})$ (Q.E.D. 2)

Fifth Question :

- [a] In $\triangle ABC$:
 $\therefore m(\angle B) = m(\angle C)$
 $\therefore AB = AC$ (1)
 $\therefore m(\widehat{BXY}) = m(\widehat{CYX})$
 By subtracting $m(\widehat{XY})$ from both sides
 $\therefore m(\widehat{BX}) = m(\widehat{CY})$
 $\therefore BX = CY$ (2)
 By subtracting (2) from (1) :
 $\therefore AX = AY$ (Q.E.D.)
 [b] In $\triangle ABC$:
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$
 $\therefore m(\angle ABC) = m(\angle ACD)$
 $\therefore \overline{CD}$ is a tangent to the circle passes through A, B, C (Q.E.D.)

6

El-Monofia

First Question :

- [a] (1) c (2) b (3) c
 [b] $\therefore E$ is the midpoint of $\overline{AB}$ $\therefore \overline{ME} \perp \overline{AB}$
 $\therefore F$ is the midpoint of $\overline{CD}$ $\therefore \overline{MF} \perp \overline{CD}$
 $\therefore AB = CD$ $\therefore ME = MF$
 In $\triangle EMF$:
 $m(\angle EFM) = m(\angle MEF) = \frac{180^\circ - 120^\circ}{2}$
 $= 30^\circ$ (The req.)

Second Question :

- [a] (1) a (2) a (3) d
 [b] $\therefore ABCD$ is a cyclic quad.
 $\therefore m(\angle BAD) = 180^\circ - 70^\circ = 110^\circ$
 In $\triangle ABD$:
 $m(\angle ABD) = 180^\circ - (110^\circ + 30^\circ) = 40^\circ$ (The req.)

Third Question :

- [a] (1) d (2) b (3) c
 [b] $\therefore \overline{AD} \parallel \overline{XY}$, $\overline{AB}$ is a transversal
 $\therefore m(\angle AXY) = m(\angle XAD)$ (alternate angles)
 $\therefore m(\angle C)$ (inscribed) $= m(\angle BAD)$ (tangency)
 $\therefore m(\angle C) = m(\angle AXY)$
 $\therefore XYCB$ is a cyclic quadrilateral. (Q.E.D.)

Fourth Question :

[a] $\because \overline{AB}, \overline{AC}$ are two tangent segments in the circle M

$$\therefore AB = AC$$

$$\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 40^\circ}{2} = 70^\circ$$

$$\therefore m(\angle BCD) = \frac{1}{2} m(\angle BMD) = \frac{1}{2} \times 140^\circ = 70^\circ$$

(inscribed and central angle subtended by $\widehat{BD}$)

$\therefore m(\angle ABC) = m(\angle BCD)$ and they are alternate angles.

$$\therefore \overline{AB} \parallel \overline{CD} \quad (\text{Q.E.D.})$$

[b] In $\triangle ABE$:

$$\because AB = EB \quad \therefore m(\angle A) = m(\angle AEB)$$

$$\therefore m(\angle A) = m(\angle C)$$

(properties of parallelogram)

$$\therefore m(\angle C) = m(\angle AEB)$$

$$\therefore EBCD \text{ is a cyclic quadrilateral.} \quad (\text{Q.E.D.})$$

Fifth Questions :

[a] $\because m(\angle A) = \frac{1}{2} m(\angle BMD) = x$
(inscribed and central angles subtended by $\widehat{BD}$)

$\therefore ABCD$ is a cyclic quad.

$$\therefore m(\angle A) + m(\angle BCD) = 180^\circ$$

$$\therefore x + 2x = 180^\circ \quad \therefore 3x = 180^\circ$$

$$\therefore x = 60^\circ$$

$$\therefore m(\angle A) = 60^\circ \quad (\text{The req.})$$

[b] $\because m(\angle E) = \frac{1}{2} [m(\widehat{AC}) - m(\widehat{BD})]$

$$\therefore 30^\circ = \frac{1}{2} [120^\circ - m(\widehat{BD})]$$

$$\therefore 60^\circ = 120^\circ - m(\widehat{BD})$$

$$\therefore m(\widehat{BD}) = 120^\circ - 60^\circ = 60^\circ \quad (\text{First req.})$$

$\therefore AB = CD$

$$\therefore m(\widehat{AB}) = m(\widehat{CD}) = \frac{360^\circ - (120^\circ + 60^\circ)}{2} = 90^\circ \quad (\text{Second req.})$$

7

El-Gharbia

First Group :

- 1 b 2 b 3 d 4 c 5 b
6 a 7 c 8 a 9 c

Second Group :

[10] $\because \overline{AB}$ is a diameter in the circle

$$\therefore m(\angle C) = 90^\circ$$

$\therefore F$ is the midpoint of $\overline{DE}$

$$\therefore \overline{MF} \perp \overline{DE} \quad \therefore m(\angle AFL) = 90^\circ$$

$$\therefore m(\angle C) = m(\angle AFL) = 90^\circ$$

$$\therefore LCBF \text{ is a cyclic quadrilateral.} \quad (\text{Q.E.D.})$$

[11] $\because m(\angle ACB)$ (inscribed)
 $= m(\angle ABE)$ (tangency)
 $= 60^\circ$

In $\triangle ABC$:

$$m(\angle ABC) = 180^\circ - (30^\circ + 60^\circ) = 90^\circ$$

$$\therefore \overline{AC} \text{ is a diameter in the circle} \quad (\text{Q.E.D.})$$

[12] $\because \overline{DE} \parallel \overline{BC}$

$$\therefore m(\widehat{CE}) = m(\widehat{BD}) = 50^\circ$$

$$\therefore m(\angle CAE) = \frac{1}{2} m(\widehat{CE}) = \frac{1}{2} \times 50^\circ = 25^\circ$$

$$\therefore 3y - 5 = 25 \quad \therefore 3y = 30$$

$$\therefore y = 10 \quad (\text{The req.})$$

[13] $\because \overline{AB}, \overline{AC}$ are two tangents to the circle M

$$\therefore AB = AC$$

$$\therefore m(\angle ABC) = m(\angle ACB)$$

$\therefore \overline{AC} \parallel \overline{BD}$, $\overline{BC}$ is a transversal

$$\therefore m(\angle CBD) = m(\angle ACB) \text{ (alternating angles)}$$

$$\therefore m(\angle ABC) = m(\angle CBD)$$

$$\therefore \overline{BC} \text{ bisects } \angle ABD \quad (\text{Q.E.D.})$$

$$\begin{aligned} [14] \therefore m(\angle AEC) &= \frac{1}{2} [m(\widehat{AC}) + m(\widehat{BD})] \\ &= \frac{1}{2} [50^\circ + 100^\circ] = 75^\circ \end{aligned}$$

$$\therefore m(\angle AED) = 180^\circ - 75^\circ = 105^\circ \quad (\text{The req.})$$

[15] $\because \overline{AB}$ is a tangent to the circle M

$$\therefore \overline{MB} \perp \overline{AB} \quad \therefore m(\angle ABM) = 90^\circ$$

$$\text{In } \triangle ABM : m(\angle AMB) = 180^\circ - (90^\circ + 40^\circ) = 50^\circ$$

$$\therefore m(\angle BDC) = \frac{1}{2} m(\angle BMC) = \frac{1}{2} \times 50^\circ = 25^\circ$$

(inscribed and central angles subtended by $\widehat{BC}$)

(The req.)

[16] $\because \overline{XY} \parallel \overline{AD}$, $\overline{AC}$ is a transversal

$$\therefore m(\angle CXY) = m(\angle CAD)$$

(corresponding angles)

$$\therefore m(\angle CBD) = m(\angle CAD)$$

(two inscribed angles subtended by $\widehat{CD}$)

$$\therefore m(\angle CXY) = m(\angle CBY)$$

and they are drawn on $\widehat{CY}$ and on one side of it.

$\therefore$ BXYC is a cyclic quadrilateral. (Q.E.D.)

8

El-Dakahlia

First Question :

[a] (1) a (2) c (3) d

[b] $\therefore$ D is the midpoint of $\overline{AB}$ $\therefore \overline{MD} \perp \overline{AB}$

$$\therefore m(\angle ADM) = 90^\circ$$

$\therefore$ E is the midpoint of $\overline{AC}$ $\therefore \overline{ME} \perp \overline{AC}$

$$\therefore m(\angle AEM) = 90^\circ$$

From the quadrilateral ADME

$$\begin{aligned}\therefore m(\angle DME) &= 360^\circ - (90^\circ + 90^\circ + 70^\circ) \\ &= 110^\circ \quad (\text{First req.})\end{aligned}$$

$$\therefore \because AB = AC \quad \therefore MD = ME$$

$$\therefore \because MX = MY = r$$

$$\text{By subtraction : } \therefore DX = EY \quad (\text{Second req.})$$

Second Question :

[a] (1) b (2) a (3) d

[b] In $\triangle ABC$:

$$\therefore AC = BC \quad \therefore m(\angle BAC) = m(\angle B)$$

$$\therefore \because m(\angle B) = m(\angle D)$$

(Properties of parallelogram)

$$\therefore m(\angle BAC) = m(\angle D)$$

$\therefore \overline{AB}$ is a tangent segment to the circle passing through the vertices of $\triangle ACD$ (Q.E.D.)

Third Question :

$$[a] \therefore \overline{DE} \parallel \overline{BC} \quad \therefore m(\widehat{BD}) = m(\widehat{CE})$$

$$\therefore m(\angle BAD) = m(\angle CAE)$$

By adding $m(\angle BAC)$ to both sides

$$\therefore m(\angle DAC) = m(\angle EAB) \quad (\text{Q.E.D.})$$

[b] $\therefore$ ABCD is a cyclic quadrilateral.

$$\therefore m(\angle BCD) = 180^\circ - 115^\circ = 65^\circ$$

$\therefore \because \overline{BF} \parallel \overline{DC}$, $\overline{BC}$ is a transversal

$$\therefore m(\angle FBC) = m(\angle BCD) = 65^\circ$$

(alternating angles)

$$\therefore m(\angle D) = m(\angle EBC) = 70^\circ + 65^\circ = 135^\circ$$

(The req.)

Fourth Question :

[a] In $\triangle ABD$:

$$\therefore AB = AD$$

$$\therefore m(\angle ABD) = m(\angle ADB) = x$$

$$\therefore m(\angle A) = 180^\circ - (x + x) = 180^\circ - 2x$$

In $\triangle BCD$: $\because DB = DC$

$$\therefore m(\angle DBC) = m(\angle C) = 2x$$

$$\therefore m(\angle A) + m(\angle C) = 180^\circ - 2x + 2x = 180^\circ$$

$\therefore$ ABCD is a cyclic quad. (Q.E.D.)

[b] $\because \overline{AB}$, $\overline{AC}$ are two tangent segments to the circle

$$\therefore AB = AC = 13 \text{ cm.}$$

$\therefore \because \overline{EB}$, $\overline{ED}$ are two tangent segments to the circle

$$\therefore EB = ED$$

$\therefore \because \overline{FC}$, $\overline{FD}$ are two tangent segments to the circle

$$\therefore FC = FD$$

$\therefore$ The perimeter of $\triangle AEF$

$$= AE + ED + AF + FD$$

$$= AE + EB + AF + FC$$

$$= AB + AC = 13 + 13 = 26 \text{ cm.} \quad (\text{The req.})$$

Fifth Question :

[a] (1) c (2) c (3) b

[b] $\because \overline{AB}$ is a diameter in the circle M

$$\therefore m(\angle ACB) = 90^\circ$$

In $\triangle ABC$:

$$m(\angle BAC) = 180^\circ - (90^\circ + 50^\circ) = 40^\circ$$

$\therefore \because \overline{AC} \parallel \overline{DM}$, $\overline{AB}$ is a transversal

$$\therefore m(\angle AMD) = m(\angle BAC) = 40^\circ$$

(alternating angles)

$$\therefore m(\angle ACD) = \frac{1}{2} m(\angle AMD) = \frac{1}{2} \times 40^\circ = 20^\circ$$

(inscribed and central angles subtended by $\widehat{AD}$)

(The req.)

9

Ismailia

First Group :

- | | | | | |
|-----|-----|-----|-----|-----|
| 1 d | 2 b | 3 a | 4 c | 5 c |
| 6 a | 7 b | 8 d | 9 d | |

Second Group :

10 $\because m(\angle B) = m(\angle C) \quad \therefore AB = AC$

$\therefore$ X is the midpoint of $\overline{AB}$

$$\therefore \overline{MX} \perp \overline{AB}$$

$$\therefore \overline{MY} \perp \overline{AC} \quad \therefore MX = MY \quad (\text{Q.E.D.})$$

[11] $\therefore$ ABCD is a cyclic quad.

$$\therefore m(\angle D) = 180^\circ - 70^\circ = 110^\circ$$

$$\therefore m(\widehat{AD}) = m(\widehat{CD}) \quad \therefore AD = CD$$

In $\triangle ADC$:

$$m(\angle DCA) = m(\angle DAC) = \frac{180^\circ - 110^\circ}{2}$$

$$= 35^\circ \quad (\text{First req.})$$

$\therefore \overline{AB}$ is a diameter in the circle

$$\therefore m(\angle ACB) = 90^\circ$$

In $\triangle ABC$:

$$m(\angle CAB) = 180^\circ - (90^\circ + 70^\circ) = 20^\circ$$

(Second req.)

[12] $\therefore m(\angle ADB) = \frac{1}{2} m(\angle AMB) = \frac{1}{2} \times 140^\circ = 70^\circ$

(inscribed and central angles subtended by $\widehat{AB}$)

$\therefore \overline{AC} \parallel \overline{DB}$, $\overline{AD}$ is a transversal

$$\therefore m(\angle CAD) + m(\angle ADB) = 180^\circ$$

(two interior angles on the same side of the transversal)

$$\therefore m(\angle CAD) = 180^\circ - 70^\circ = 110^\circ \quad (\text{The req.})$$

[13] In $\triangle AED$:

$$\therefore AD = DE \quad \therefore m(\angle A) = m(\angle AED)$$

$\therefore m(\angle A) = m(\angle C)$ (properties of parallelogram)

$$\therefore m(\angle C) = m(\angle AED)$$

$\therefore$ EBCD is a cyclic quadrilateral. (Q.E.D.)

[14] $\therefore m(\angle ABC)$ (tangency)

$$= m(\angle BDC) \text{ (inscribed)} = 65^\circ$$

$\therefore \overline{AB}$, $\overline{AC}$ are two tangent segments to circle

$$\therefore AB = AC$$

$$\therefore m(\angle ABC) = m(\angle ACB) = 65^\circ$$

$$\therefore m(\angle BAC) = 180^\circ - (65^\circ + 65^\circ) = 50^\circ \quad (\text{The req.})$$

[15] $\therefore$ ABCD is a cyclic quadrilateral.

$$\therefore m(\angle ADC) = m(\angle CBE) = 95^\circ$$

$$\therefore m(\angle ADB) = \frac{1}{2} m(\widehat{AB}) = \frac{1}{2} \times 110^\circ = 55^\circ$$

$$\therefore m(\angle BDC) = 95^\circ - 55^\circ = 40^\circ \quad (\text{The req.})$$

[16] $\therefore \overline{BE}$ is a tangent to the circle

$$\therefore m(\angle BAD) + m(\angle c) = 180^\circ$$

$$\therefore m(\angle BAD) = 180^\circ - 50^\circ = 130^\circ \quad (\text{The req.})$$

10

Suez

First Group :

- | | | | | |
|-------|-------|-------|-------|-------|
| [1] d | [2] c | [3] a | [4] d | [5] a |
| [6] b | [7] c | [8] d | [9] b | |

Second Group :

- [10] $\therefore$ D is the midpoint of $\overline{AB}$ $\therefore \overline{MD} \perp \overline{AB}$
 $\therefore$ E is the midpoint of $\overline{AC}$ $\therefore \overline{ME} \perp \overline{AC}$
 $\therefore AB = AC$ $\therefore MD = ME$
 $\therefore MX = MY = r$
 By subtraction : $\therefore DX = EY$ (Q.E.D.)
- [11] $\therefore m(\angle M) = 2 m(\angle B)$
 (central and inscribed angles subtended by $\widehat{AC}$)
 $\therefore m(\angle M) = 2 \times 30^\circ = 60^\circ$
 $\therefore \overline{AB} \parallel \overline{CM}$, $\overline{AM}$ is a transversal
 $\therefore m(\angle A) = m(\angle M) = 60^\circ$ (alternate angles)
 (The req.)
- [12] $\therefore m(\widehat{AC}) = 2 m(\angle B) = 2 \times 40^\circ = 80^\circ$
 $\therefore \overline{AB}$ is a diameter in the circle
 $\therefore m(\widehat{AB}) = 180^\circ$
 $\therefore m(\widehat{CB}) = 180^\circ - 80^\circ = 100^\circ$
 $\therefore \overline{ED} \parallel \overline{BC}$
 $\therefore m(\widehat{CD}) = m(\widehat{BD}) = \frac{1}{2} \times 100^\circ = 50^\circ$ (The req.)
- [13] In $\triangle ABC$:
 $m(\angle B) = 180^\circ - (50^\circ + 30^\circ) = 100^\circ$
 $\therefore$ ABCD is a cyclic quadrilateral.
 $\therefore m(\angle D) = 180^\circ - 100^\circ = 80^\circ$ (The req.)
- [14] $\therefore \overline{AE}$ is a diameter in the circle
 $\therefore m(\angle ADE) = 90^\circ$
 $\therefore \overline{AC} \perp \overline{BC}$ $\therefore m(\angle ACB) = 90^\circ$
 $\therefore m(\angle ADB) = m(\angle ACB) = 90^\circ$
 and they are drawn on $\overline{AB}$ and on one side of it.
 $\therefore$ ABCD is a cyclic quadrilateral. (Q.E.D.)
- [15] $\therefore \overline{AB}$, $\overline{AC}$ are two tangents to the circle
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 40^\circ}{2} = 70^\circ$
 $\therefore$ BCDE is a cyclic quadrilateral.
 $\therefore m(\angle CBE) = 180^\circ - 110^\circ = 70^\circ$
 $\therefore m(\angle ABC) = m(\angle CBE)$

$\therefore \overline{BC}$ bisects $\angle ABE$ (Q.E.D. 1)

$\therefore m(\angle CBE) = m(\angle ACB) = 70^\circ$
and they are alternate angles.

$\therefore \overline{BE} \parallel \overline{AC}$ (Q.E.D. 2)

16 In $\triangle ABC$:

$$\therefore m(\angle BAC) = 90^\circ \quad \therefore \cos C = \frac{4}{8} = \frac{1}{2}$$

$$\therefore m(\angle C) = 60^\circ \quad \therefore m(\angle C) = m(\angle BAD)$$

$\therefore \overline{AD}$ is a tangent to the circle passes through the vertices of $\triangle ABC$ (Q.E.D.)

11 Damietta

First Question :

[a] (1) a (2) b (3) c

[b] $\therefore \overline{ME} \perp \overline{AB}$ $\therefore AE = BE = 5$ cm.

In $\triangle AME$

$$\therefore m(\angle AEM) = 90^\circ, m(\angle AME) = 30^\circ$$

$$\therefore AM = 2AE = 2 \times 5 = 10 \text{ cm.}$$

$$\therefore CD = 2AM = 2 \times 10 = 20 \text{ cm.} \quad (\text{The req.})$$

Second Question :

[a] (1) c (2) a (3) d

$$\begin{aligned} \text{[b]} m(\angle EAC) &= \frac{1}{2} [m(\widehat{EC}) - m(\widehat{DB})] \\ &= \frac{1}{2} (100^\circ - 30^\circ) = 35^\circ \quad (\text{The req.}) \end{aligned}$$

Third Question :

[a] (1) c (2) b (3) d

[b] $\therefore \overline{XA}, \overline{XB}$ are two tangents to the circle

$$\therefore XA = XB$$

$$\therefore m(\angle XAB) = m(\angle XBA) = \frac{180^\circ - 70^\circ}{2} = 55^\circ$$

$\therefore ABCD$ is a cyclic quadrilateral.

$$\therefore m(\angle BAD) = 180^\circ - 125^\circ = 55^\circ$$

$$\therefore m(\angle XAB) = m(\angle BAD) = 55^\circ$$

$\therefore \overline{AB}$ bisects $\angle DAX$ (Q.E.D.)

Fourth Question :

$$\text{[a]} \therefore \overline{AB} \parallel \overline{CD} \quad \therefore m(\widehat{AC}) = m(\widehat{BD})$$

$$\therefore m(\angle A) = m(\angle B) \quad \therefore AE = BE$$

$\therefore \triangle AEB$ is an isosceles triangle. (Q.E.D.)

[b] $\therefore \overline{AX} \parallel \overline{CE}, \overline{AD}$ is a transversal

$$\therefore m(\angle EAX) = m(\angle AEC) \text{ (alternating angles)}$$

$\therefore BCED$ is a cyclic quadrilateral.

$$\therefore m(\angle B) = m(\angle AEC)$$

$$\therefore m(\angle B) = m(\angle DAX)$$

$\therefore \overline{AX}$ is a tangent to the circle passes through the vertices of $\triangle ABD$ (Q.E.D.)

Fifth Question :

[a] In $\triangle ABD$:

$$\therefore AB = AD$$

$$\therefore m(\angle D) = m(\angle ABD) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$$

$$\therefore m(\angle D) = m(\angle C) = 50^\circ$$

and they are drawn on $\overline{AB}$ and on one side of it.

$\therefore$ The points A, B, C and D lie on one circle.

(Q.E.D.)

[b] $\therefore \overline{AB}$ is a tangent to the smaller circle

$$\therefore \overline{MD} \perp \overline{AB} \quad \therefore m(\angle ADM) = 90^\circ$$

$\therefore \overline{AC}$ is a tangent to the smaller circle

$$\therefore \overline{ME} \perp \overline{AC} \quad \therefore m(\angle AEM) = 90^\circ$$

$$\therefore m(\angle ADM) + m(\angle AEM) = 90^\circ + 90^\circ = 180^\circ$$

$\therefore ADME$ is a cyclic quadrilateral. (Q.E.D. 1)

$$\therefore m(\angle DME) + m(\angle DAE) = 180^\circ \quad (1)$$

$$\therefore m(\angle DME) = m(\widehat{DE}) \quad (2)$$

$$\therefore m(\angle BAC) = \frac{1}{2} m(\widehat{BC}) \quad (3)$$

From (1), (2) and (3):

$$\therefore m(\widehat{DE}) + \frac{1}{2} m(\widehat{BC}) = 180^\circ \quad (\text{Q.E.D. 2})$$

12 Kafr El-Sheikh

First Group :

- | | | | | |
|-----|-----|-----|-----|-----|
| 1 a | 2 b | 3 c | 4 c | 5 b |
| 6 b | 7 b | 8 a | 9 d | |

Second Group :

10 $\therefore ABCD$ is a cyclic quadrilateral.

$$\therefore m(\angle D) = m(\angle ABE) = 100^\circ$$

In $\triangle ADC$:

$$m(\angle ACD) = 180^\circ - (100^\circ + 40^\circ) = 40^\circ$$

$$\therefore m(\angle CAD) = m(\angle ACD)$$

$$\therefore m(\widehat{CD}) = m(\widehat{AD}) \quad (\text{Q.E.D.})$$

- 11 $\therefore \overline{AB}, \overline{AC}$ are two tangent segments to the circle
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$
 $\therefore m(\angle BDC)$ (inscribed)
 $= m(\angle ABC)$ (tangency) $= 50^\circ$ (The req.)

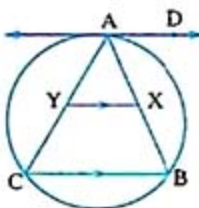
- 12 In $\triangle AMB$:
 $\therefore AM = BM = r$
 $\therefore m(\angle MAB) = m(\angle MBA) = 50^\circ$
 $\therefore m(\angle AMB) = 180^\circ - (50^\circ + 50^\circ) = 80^\circ$
 $\therefore m(\angle ACB) = \frac{1}{2} m(\angle AMB) = \frac{1}{2} \times 80^\circ = 40^\circ$
 (inscribed and central angles subtended by $\widehat{AB}$)
 (The req.)

- 13 In $\triangle AMC$:
 $\therefore (CM)^2 = (10)^2 = 100$
 $\therefore (AM)^2 + (AC)^2 = (6)^2 + (8)^2 = 100$
 $\therefore (CM)^2 = (AM)^2 + (AC)^2 \therefore m(\angle MAC) = 90^\circ$
 $\therefore \overline{BC}$ is a tangent to the circle M
 $\therefore \overline{MB} \perp \overline{BC}$
 $\therefore m(\angle MBC) = 90^\circ$
 $\therefore m(\angle MAC) + m(\angle MBC) = 90^\circ + 90^\circ = 180^\circ$
 $\therefore AMBC$ is cyclic quadrilateral. (Q.E.D.)

- 14 $\therefore \overline{MN}$ is the line of centres
 $\therefore \overline{AB}$ is a common chord $\therefore \overline{MN} \perp \overline{AB}$
 $\therefore E$ is the midpoint of $\overline{AC} \therefore \overline{ME} \perp \overline{AC}$
 $\therefore AB = AC$
 $\therefore MD = ME$ (Q.E.D.)

- 15 $\therefore ABCD$ is a rectangle
 $\therefore AB = DC \therefore m(\widehat{AB}) = m(\widehat{DC})$
 $\therefore AE = BC \therefore m(\widehat{AE}) = m(\widehat{BC})$
 By subtracting $m(\widehat{BE})$ from both sides
 $\therefore m(\widehat{AB}) = m(\widehat{CE}) \therefore m(\widehat{DC}) = m(\widehat{CE})$
 $\therefore DC = CE$ (Q.E.D.)

- 16 $\therefore \overline{XY} \parallel \overline{BC}$
 $\therefore \overline{AC}$ is a transversal
 $\therefore m(\angle AYX) = m(\angle C)$
 (corresponding angles)
 $\therefore m(\angle BAD)$ (tangency)
 $= m(\angle C)$ (inscribed)
 $\therefore m(\angle AYX) = m(\angle DAX)$
 $\therefore \overline{AD}$ is a tangent to the circle passes through the points A, X, Y (Q.E.D.)



13

El-Beheira

First Group :

- 1 d 2 a 3 c 4 b 5 d
 6 b 7 a 8 c 9 c

Second Group :

- 10 $\therefore m(\angle BDC) = \frac{1}{2} m(\angle BMC) = \frac{1}{2} \times 100^\circ = 50^\circ$
 (inscribed and central angles subtended by $\widehat{BC}$)
 $\therefore \angle ABD$ is an exterior angle of $\triangle BCD$
 $\therefore m(\angle DCB) = 120^\circ - 50^\circ = 70^\circ$ (The req.)
- 11 $\therefore \overline{XY} \parallel \overline{BC}, \overline{AC}$ is a transversal
 $\therefore m(\angle AYX) = m(\angle C)$
 (corresponding angles)
 $\therefore m(\angle BAD)$ (tangency)
 $= m(\angle C)$ (inscribed)
 $\therefore m(\angle AYX) = m(\angle DAX)$
 $\therefore \overline{AD}$ is a tangent to the circle passing through the points A, X and Y (Q.E.D.)
- 12 $\therefore \overline{XY}, \overline{XZ}$ are two tangents to the circle
 $\therefore XY = XZ$
 $\therefore m(\angle XZY) = m(\angle XYZ) = \frac{180^\circ - 40^\circ}{2} = 70^\circ$
 $\therefore m(\angle YEZ)$ (inscribed)
 $= m(\angle XZY)$ (tangency)
 $= 70^\circ$
 $\therefore DEYZ$ is a cyclic quadrilateral.
 $\therefore m(\angle EYZ) = 180^\circ - 110^\circ = 70^\circ$
 $\therefore m(\angle YEZ) = m(\angle EYZ) = 70^\circ$
 $\therefore ZY = ZE$ (Q.E.D.)
- 13 $\therefore ABCD$ is a cyclic quadrilateral.
 $\therefore m(\angle D) = m(\angle ABE) = 100^\circ$
 In $\triangle ADC$:
 $\therefore m(\angle ACD) = 180^\circ - (100^\circ + 40^\circ) = 40^\circ$
 $\therefore m(\angle CAD) = m(\angle ACD) = 40^\circ$
 $\therefore AD = CD$ (Q.E.D.)
- 14 In $\triangle ABC$:
 $\therefore m(\angle B) = m(\angle C) \therefore AB = AC$
 $\therefore X$ is the midpoint of $\overline{AB} \therefore \overline{MX} \perp \overline{AB}$
 $\therefore \overline{MY} \perp \overline{AC}$
 $\therefore MX = MY$ (Q.E.D.)

- [15] $\therefore m(\widehat{BC}) = 2m(\angle BAC) = 2 \times 30^\circ = 60^\circ$
 $\therefore \overline{AB}$ is a diameter in the circle M
 $\therefore m(\widehat{AC}) = 180^\circ - 60^\circ = 120^\circ$
 $\therefore D$ is the midpoint of $\widehat{AC}$
 $\therefore m(\widehat{AD}) = m(\widehat{DC}) = \frac{1}{2} \times 120^\circ = 60^\circ$
 $\therefore m(\angle DBA) = \frac{1}{2} m(\widehat{AD}) = \frac{1}{2} \times 60^\circ = 30^\circ$
 $\therefore m(\angle CAD) = \frac{1}{2} m(\widehat{DC}) = \frac{1}{2} \times 60^\circ = 30^\circ$
 (The req.)

- [16] $\therefore \overline{CE} \perp \overline{AB}$ $\therefore m(\angle AEC) = 90^\circ$
 $\therefore \overline{AD} \perp \overline{BC}$ $\therefore m(\angle ADC) = 90^\circ$
 $\therefore m(\angle AEC) = m(\angle ADC) = 90^\circ$
 and they are drawn on $\overline{AC}$ and on one side of it.
 $\therefore AEDC$ is a cyclic quadrilateral. (Q.E.D. 1)
 $\therefore m(\angle ECD) = m(\angle EAD)$
 (drawn on $\overline{ED}$ and on one side of it)
 $\therefore m(\angle BCX) = m(\angle BAX)$
 (two inscribed angles subtended by $\widehat{BX}$)
 $\therefore m(\angle ECB) = m(\angle BCX)$
 $\therefore \overline{CB}$ bisects $\angle ECX$ (Q.E.D. 2)

14

El-Fayoum

First Question :

- [a] (1) c (2) d (3) a
 [b] $\therefore \triangle ABC$ is an equilateral triangle
 $\therefore m(\angle ABC) = 60^\circ$
 $\therefore m(\angle ADC) = m(\angle ABC) = 60^\circ$
 (two inscribed angles subtended by $\widehat{AC}$)
 $\therefore$ In $\triangle ADE$:
 $\therefore AD = DE, m(\angle ADE) = 60^\circ$
 $\therefore \triangle ADE$ is an equilateral triangle. (Q.E.D.)

Second Question :

- [a] $\therefore \overline{AB}, \overline{AC}$ are tangents to the circle
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 50^\circ}{2} = 65^\circ$
 $\therefore BCDE$ is a cyclic quadrilateral.
 $\therefore m(\angle CBE) = 180^\circ - 115^\circ = 65^\circ$
 $\therefore m(\angle ABC) = m(\angle CBE) = 65^\circ$
 $\therefore \overline{BC}$ bisects $\angle ABE$ (Q.E.D. 1)
 $\therefore m(\angle BEC)$ (inscribed)
 $= m(\angle ABC)$ (tangency)
 $= 65^\circ$

$$\therefore m(\angle CBE) = m(\angle BEC) = 65^\circ$$

$$\therefore CB = CE \quad (\text{Q.E.D. 2})$$

$$\therefore m(\angle CBE) = m(\angle ACB) = 65^\circ$$

and they are alternate angles.

$$\therefore \overline{AC} \parallel \overline{BC} \quad (\text{Q.E.D. 3})$$

$$[b] \therefore m(\angle ABC) = \frac{1}{2} m(\widehat{AC}) = \frac{1}{2} \times 100^\circ = 50^\circ$$

$\therefore \angle DEB$ is an exterior angle of $\triangle EBC$

$$\therefore m(\angle C) = 110^\circ - 50^\circ = 60^\circ \quad (\text{The req.})$$

Third Question :

- [a] (1) a (2) d (3) c
 [b] In $\triangle ABC$:
 $\therefore m(\angle B) = m(\angle C) \therefore AB = AC$
 $\therefore X$ is a midpoint of $\overline{AB} \therefore \overline{MX} \perp \overline{AB}$
 $\therefore \overline{MY} \perp \overline{AC}$
 $\therefore MX = MY$ (Q.E.D.)

Fourth Question :

- [a] $\therefore \overline{AB}$ is a diameter in the circle M
 $\therefore m(\angle ADB) = 90^\circ$
 In $\triangle ABD$:
 $\therefore m(\angle BAD) = 180^\circ - (90^\circ + 25^\circ) = 65^\circ$
 $\therefore \therefore ABCD$ is a cyclic quadrilateral.
 $\therefore m(\angle C) = 180^\circ - 65^\circ = 115^\circ$ (The req.)
 [b] $\therefore AD = BE$ (1)
 $\therefore m(\widehat{AD}) = m(\widehat{BE})$
 By adding $m(\widehat{DE})$ to both sides
 $\therefore m(\widehat{ADE}) = m(\widehat{BED})$
 $\therefore m(\angle A) = m(\angle B)$
 In $\triangle ABC : AC = BC$ (2)
 By subtracting (1) from (2) :
 $\therefore CD = CE$ (Q.E.D.)

Fifth Question :

- [a] (1) d (2) a (3) a
 [b] $\therefore \overline{AF} \parallel \overline{ED}, \overline{AB}$ is a transversal
 $\therefore m(\angle AED) = m(\angle FAE)$ (alternating angles)
 $\therefore m(\angle ACB)$ (inscribed)
 $= m(\angle FAB)$ (tangency)
 $\therefore m(\angle DCB) = m(\angle AED)$
 $\therefore DEBC$ is a cyclic quadrilateral. (Q.E.D.)

First Question :

- (1) b (2) d (3) a
 (4) d (5) a (6) b

Second Question :

- [a] (1) c (2) b (3) c

[b] $\because Y$ is the midpoint of $\overline{AC}$

$$\therefore \overline{MY} \perp \overline{AC}$$

$$\therefore \overline{MX} \perp \overline{AB} \quad \therefore MX = MY$$

$$\therefore AB = AC$$

$$\therefore m(\angle B) = m(\angle C) = 75^\circ$$

$$\therefore m(\angle BAC) = 180^\circ - (75^\circ + 75^\circ) = 30^\circ$$

(The req.)

Third Question :

$$[a] m(\angle BMC) = 2 m(\angle BAC) = 2 \times 50^\circ = 100^\circ \quad (\text{First req.})$$

(central and inscribed angles subtended by $\widehat{BC}$)In $\triangle MBC$:

$$\therefore MB = MC = r$$

$$\therefore m(\angle MBC) = m(\angle MCB) = \frac{180^\circ - 100^\circ}{2} = 40^\circ \quad (\text{Second req.})$$

$$[b] \text{ The measure of the arc } = \frac{3}{5} \times 360^\circ = 216^\circ$$

$$\text{The length of the arc} = \frac{3}{5} \times 2 \times \frac{22}{7} \times 7 = 26.4 \text{ cm.}$$

Fourth Question :

$$[a] \because \overline{ME} \perp \overline{AC} \quad \therefore m(\angle CEM) = 90^\circ$$

 $\because \overline{CB}$ is a tangent to the circle M

$$\therefore \overline{MB} \perp \overline{CB} \quad \therefore m(\angle CBM) = 90^\circ$$

$$\therefore m(\angle CEM) + m(\angle CBM) = 90^\circ + 90^\circ = 180^\circ$$

 $\therefore$ EMBC is a cyclic quadrilateral. (Q.E.D. 1)

$$\therefore m(\angle C) = m(\angle DMB)$$

$$\therefore m(\angle DMB) = 2 m(\angle DAB)$$

(central and inscribed angles subtended by $\widehat{DB}$)

$$\therefore m(\angle C) = 2 m(\angle DAB) \quad (\text{Q.E.D. 2})$$

$$[b] \because AB = AC \quad \therefore m(\angle B) = m(\angle C)$$

$$\therefore \frac{1}{2} m(\angle B) = \frac{1}{2} m(\angle C)$$

$$\therefore m(\angle YBX) = m(\angle YCX)$$

and they are drawn on $\overline{YX}$ and on one side of it. $\therefore$ BCXY is a cyclic quadrilateral. (Q.E.D.)

Fifth Question :

[a] $\because \overline{AD}, \overline{AE}$ are tangent segments to the circle

$$\therefore AD = AE = 2 \text{ cm.}$$

 $\because \overline{BD}, \overline{BF}$ are tangent segments to the circle

$$\therefore BD = BF = 5 \text{ cm.}$$

 $\because \overline{CE}, \overline{CF}$ are tangent segments to the circle

$$\therefore CE = CF = 4 \text{ cm.}$$

 $\therefore$ The perimeter of $\triangle ABC$

$$= 2 + 2 + 5 + 5 + 4 + 4 = 22 \text{ cm.} \quad (\text{Q.E.D.})$$

[b] $\because \overline{XY} \parallel \overline{BC}$, $\overline{AB}$ is a transversal

$$\therefore m(\angle AXY) = m(\angle B) \quad (\text{corresponding angles})$$

$$\therefore m(\angle CAD) \quad (\text{tangency})$$

$$= m(\angle B) \quad (\text{inscribed})$$

$$\therefore m(\angle AXY) = m(\angle YAD)$$

 $\therefore \overline{AD}$ is a tangent to the circle passes through the points A, X and Y (Q.E.D.)

First Question :

- (1) b (2) c (3) d
 (4) b (5) a (6) a

Second Question :

- [a] (1) b (2) b (3) b

[b] $\because \overline{MX} \perp \overline{AB}, \overline{MY} \perp \overline{AC}$

$$\therefore MX = MY \quad \therefore AB = AC$$

$$\therefore m(\angle B) = 60^\circ$$

 $\therefore \triangle ABC$ is an equilateral triangle

$$\therefore \text{The perimeter of } \triangle ABC = 3 \times 11 = 33 \text{ cm.}$$

(The req.)

Third Question :

[a] $\because \overline{AB}$ is a tangent to the circle M

$$\therefore \overline{MB} \perp \overline{AB} \quad \therefore m(\angle ABM) = 90^\circ$$

$$\therefore m(\angle BMC) = 2 m(\angle BDC) = 2 \times 25^\circ = 50^\circ$$

(central and inscribed angles subtended by $\widehat{BC}$)

$$\therefore m(\angle A) = 180^\circ - (90^\circ + 50^\circ) = 40^\circ \quad (\text{The req.})$$

[b] In $\triangle ABD$:

$$\therefore m(\angle ABD) = 180^\circ - (75^\circ + 50^\circ) = 55^\circ$$

$$\therefore m(\angle CBD) = 130^\circ - 55^\circ = 75^\circ$$

$$\therefore m(\angle A) = m(\angle CBD)$$

$\therefore \overline{BC}$ is a tangent to the circle passes through the points A, B and D (Q.E.D.)

Fourth Question :

[a] $\therefore \overline{XY} \parallel \overline{AD}$, $\overline{AB}$ is a transversal

$$\therefore m(\angle DAY) = m(\angle AYX)$$

(alternating angles)

$$\therefore m(\angle ACB) \text{ (inscribed)}$$

$$= m(\angle DAB) \text{ (tangency)}$$

$$\therefore m(\angle ACB) = m(\angle AYX)$$

$\therefore XCBY$ is a cyclic quadrilateral. (Q.E.D.)

[b] $\therefore AB = CD$ (properties of rectangle)

$$\therefore CD = DE \quad \therefore AB = DE$$

$$\therefore m(\widehat{AB}) = m(\widehat{DE})$$

By adding $m(\widehat{AE})$ to both sides

$$\therefore m(\widehat{BE}) = m(\widehat{AD})$$

$$\therefore BE = AD \quad \text{(Q.E.D.)}$$

Fifth Question :

[a] $\therefore \triangle ABD$ is an equilateral triangle

$$\therefore m(\angle A) = 60^\circ$$

$\therefore ABCD$ is a cyclic quadrilateral

$$\therefore m(\angle C) = 180^\circ - 60^\circ = 120^\circ \quad \text{(The req.)}$$

$$[b] \therefore m(\angle BCD) = \frac{1}{2} m(\angle BMD) = \frac{1}{2} \times 120^\circ = 60^\circ$$

(central and inscribed angles subtended by $\widehat{BD}$)

(First req.)

$\therefore \overline{AB} \parallel \overline{CD}$, $\overline{BC}$ is a transversal

$$\therefore m(\angle ABC) = m(\angle BCD) = 60^\circ$$

(alternating angles)

$\therefore \overline{AB}$, $\overline{AC}$ are tangent segments to the circle

$$\therefore AB = AC$$

$$\therefore m(\angle ABC) = m(\angle ACB) = 60^\circ$$

$$\therefore m(\angle A) = 180^\circ - (60^\circ + 60^\circ) = 60^\circ \quad \text{(Second req.)}$$

17

Souhag

First Group :

- 1 c 2 c 3 d 4 c 5 d
6 c 7 a 8 c 9 d

Second Group :

$$[10] \therefore m(\angle ADB) = \frac{1}{2} m(\widehat{AB}) = \frac{1}{2} \times 110^\circ = 55^\circ$$

$\therefore ABCD$ is a cyclic quadrilateral.

$$\therefore m(\angle EBC) = m(\angle ADC) = 30^\circ + 55^\circ$$

$$= 85^\circ \quad \text{(The req.)}$$

[11] $\therefore \overline{XY} \parallel \overline{BC}$, $\overline{AC}$ is a transversal

$$\therefore m(\angle AYX) = m(\angle ACB) \text{ (corresponding angles)}$$

$$\therefore m(\angle DAB) \text{ (tangency)}$$

$$= m(\angle ACB) \text{ (inscribed)}$$

$$\therefore m(\angle AYX) = m(\angle DAX)$$

$\therefore \overline{AD}$ is a tangent to the circle passes through the points A, X and Y (Q.E.D.)

[12] In $\triangle ABC$:

$$\therefore AB = AC \quad \therefore m(\angle B) = m(\angle C)$$

$$\therefore m(\widehat{CED}) = m(\widehat{BDE})$$

By subtracting $m(\widehat{DE})$ from both sides

$$\therefore m(\widehat{BD}) = m(\widehat{CE})$$

$$\therefore BD = CE \quad \text{(Q.E.D.)}$$

$$[13] \therefore m(\angle BCD) = \frac{1}{2} m(\angle BMD) \\ = \frac{1}{2} \times 120^\circ = 60^\circ$$

(inscribed and central angles subtended by $\widehat{BD}$)

$\therefore \overline{AB} \parallel \overline{CD}$, $\overline{BC}$ is a transversal

$$\therefore m(\angle ABC) = m(\angle BCD)$$

(alternating angles) (1)

$\therefore \overline{AB}$, $\overline{AC}$ are tangent segments to the circle M

$$\therefore AB = AC \quad \text{(2)}$$

From (1), (2) :

$\triangle ABC$ is an equilateral triangle (Q.E.D.)

$$[14] \therefore m(\widehat{AY}) = m(\widehat{AX})$$

$$\therefore m(\angle ABY) = m(\angle ACX)$$

and they are drawn on $\overline{DE}$ and on one side of it

$\therefore BCED$ is a cyclic quadrilateral. (Q.E.D. 1)

$$\therefore m(\angle DEB) = m(\angle DCB)$$

$$\therefore m(\angle XCB) = m(\angle XAB)$$

(inscribed angles subtended by $\widehat{XB}$)

$$\therefore m(\angle DEB) = m(\angle XAB) \quad \text{(Q.E.D. 2)}$$

$$[15] \therefore \overline{AB} \parallel \overline{CD}$$

$$\therefore m(\widehat{AC}) = m(\widehat{BD}) = \frac{180^\circ - 80^\circ}{2} = 50^\circ$$

$$\therefore m(\angle DEB) = \frac{1}{2} m(\widehat{BD}) = \frac{1}{2} \times 50^\circ = 25^\circ$$

(First req.)

$$\begin{aligned} \therefore m(\angle AFE) &= \frac{1}{2} [m(\widehat{AE}) + m(\widehat{DB})] \\ &= \frac{1}{2} [100^\circ + 50^\circ] = 75^\circ \end{aligned}$$

(Second req.)

- [16] $\therefore \overline{AB}, \overline{AC}$ are tangents to the smaller circle
 $\therefore AB = AC = 10$ cm.
 $\therefore \overline{AB}, \overline{AD}$ are tangents to the greater circle
 $\therefore AB = AD = 10$ cm.
 $\therefore x + 7 = 10$
 $\therefore x = 3$ (The req.)

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Qena

First Question :

- [a] (1) b (2) b (3) d
 [b] $\therefore ABCD$ is a cyclic quadrilateral.
 $\therefore m(\angle BAD) = m(\angle DCE) = 100^\circ$
 $\therefore m(\angle DCF) = 100^\circ - 70^\circ = 30^\circ$ (The req.)

Second Question :

- [a] (1) b (2) a (3) c
 [b] $\therefore \overline{AB}$ is a tangent segment to the circle M
 $\therefore \overline{MB} \perp \overline{AB} \therefore m(\angle ABM) = 90^\circ$
 $\therefore \overline{AC}$ is a tangent segment to the circle M
 $\therefore \overline{MC} \perp \overline{AC}$
 $\therefore m(\angle ACM) = 90^\circ$
 $\therefore m(\angle ABM) + m(\angle ACM) = 90^\circ + 90^\circ = 180^\circ$
 $\therefore ABMC$ is a cyclic quadrilateral. (Q.E.D.)

Third Question :

- [a] (1) b (2) c (3) b
 [b] $\therefore \overline{XA}, \overline{XB}$ are tangents to the circle
 $\therefore XA = XB$
 $\therefore m(\angle XBA) = m(\angle XAB) = \frac{180^\circ - 70^\circ}{2} = 55^\circ$
 $\therefore ABCD$ is a cyclic quadrilateral.
 $\therefore m(\angle DAB) = 180^\circ - 125^\circ = 55^\circ$
 $\therefore m(\angle XBA) = m(\angle DAB)$
 and they are alternate angles.
 $\therefore \overline{AD} \parallel \overline{XB}$ (Q.E.D.)

Fourth Question :

- [a] $\therefore \overline{AB}$ is a tangent to the circle M
 $\therefore \overline{MA} \perp \overline{AB}$
 $\therefore m(\angle BAM) = 90^\circ$
 In $\triangle ABM$:
 $\therefore (BM)^2 = (AB)^2 + (AM)^2 = (12)^2 + (5)^2 = 169$
 $\therefore BM = \sqrt{169} = 13$ cm.
 $\therefore BC = 13 - 5 = 8$ cm. (The req.)
 [b] In $\triangle ABC$:
 $\therefore AB = AC$
 $\therefore m(\angle ABC) = m(\angle ACB) = \frac{180^\circ - 50^\circ}{2} = 65^\circ$
 $\therefore m(\angle ACB) = m(\angle ABD)$
 $\therefore \overline{BD}$ is a tangent to the circle M (Q.E.D.)

Fifth Question :

- [a] $\therefore m(\angle BMD) = m(\widehat{BCD}) = 160^\circ$
 $\therefore m(\widehat{BAD}) = 360^\circ - 160^\circ = 200^\circ$
 $\therefore m(\angle C) = \frac{1}{2} m(\widehat{BAD}) = \frac{1}{2} \times 200^\circ = 100^\circ$ (The req.)
 [b] $\therefore \overline{AD} \parallel \overline{BC} \therefore m(\widehat{AB}) = m(\widehat{CD})$
 $\therefore AB = CD$
 $\therefore X$ is the midpoint of $\overline{AB}$
 $\therefore \overline{MX} \perp \overline{AB}$
 $\therefore \overline{MY} \perp \overline{CD} \therefore MX = MY$ (Q.E.D.)

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Luxor

First Group :

- [1] d [2] c [3] a [4] d [5] a
 [6] b [7] c [8] a [9] b

Second Group :

- [10] In $\triangle ABD$: $\therefore AB = AD$
 $\therefore m(\angle ABD) = m(\angle ADB) = 40^\circ$
 $\therefore m(\angle A) = 180^\circ - (40^\circ + 40^\circ) = 100^\circ$
 $\therefore m(\angle A) + m(\angle C) = 100^\circ + 80^\circ = 180^\circ$
 $\therefore ABCD$ is a cyclic quadrilateral. (Q.E.D.)
 [11] $\therefore ABCD$ is a cyclic quadrilateral.
 $\therefore m(\angle CDE) = m(\angle CBA) = 120^\circ$
 $\therefore \overline{AD}$ is a diameter $\therefore m(\angle ACD) = 90^\circ$

$\therefore \angle CDE$ is an exterior angle of $\triangle ACD$

$$\therefore m(\angle CAD) = 120^\circ - 90^\circ = 30^\circ \quad (\text{The req.})$$

$$[12] \therefore m(\angle BMC) = 2m(\angle BAC) = 2 \times 30^\circ = 60^\circ \quad (1)$$

(central and inscribed angles subtended by $\widehat{BC}$)

$$\therefore MB = MC = r \quad (2)$$

From : (1), (2) :

$\therefore \triangle MBC$ is an equilateral triangle

$$\therefore MB = MC = 7 \text{ cm.}$$

$\therefore$ The circumference of the circle

$$= 2 \times 7 \times \frac{22}{7} = 44 \text{ cm.} \quad (\text{The req.})$$

$$[13] \therefore EX = YD, ME = MD = r$$

$$\therefore MX = MY$$

$$\therefore X \text{ is the midpoint of } \overline{AB} \therefore \overline{MX} \perp \overline{AB}$$

$$\therefore Y \text{ is the midpoint of } \overline{BC} \therefore \overline{MY} \perp \overline{BC}$$

$$\therefore AB = BC \quad (\text{Q.E.D.})$$

$$[14] \therefore \overline{AB}, \overline{AC} \text{ are tangents to the circle M at B, C}$$

$$\therefore \overline{MA} \text{ bisects } \angle BMC$$

$$\therefore m(\angle BAC) = 2m(\angle BAM) = 2 \times 25^\circ = 50^\circ$$

$$\therefore \overline{MB} \perp \overline{AB} \therefore (\angle ABM) = 90^\circ$$

$$\therefore \overline{MC} \perp \overline{AC} \therefore m(\angle ACM) = 90^\circ$$

From the quadrilateral ABMC :

$$\therefore m(\angle BMC) = 360^\circ - (90^\circ + 90^\circ + 50^\circ) = 130^\circ \quad (\text{The req.})$$

$$[15] \therefore m(\widehat{AD}) = 2m(\angle ACD) = 2 \times 40^\circ = 80^\circ$$

$$\therefore m(\widehat{AD}) = m(\widehat{DB}) = 80^\circ$$

$$\therefore m(\widehat{AB}) = 80^\circ + 80^\circ = 160^\circ$$

$$\therefore m(\angle AMB) = m(\widehat{AB}) = 160^\circ \quad (\text{The req.})$$

$$[16] \therefore \overline{AC}, \overline{AE} \text{ are tangents to the circle N at B and D}$$

$$\therefore AB = AD = 9 \text{ cm.}$$

$$\therefore x + 2 = 9 \therefore x = 7$$

$$\therefore \overline{AC}, \overline{AE} \text{ are tangents to the circle M at C and E}$$

$$\therefore AB = AD$$

By subtracting :

$$\therefore ED = CB = 3 \text{ cm.}$$

$$\therefore y - 1 = 3 \therefore y = 4 \quad (\text{Q.E.D.})$$

First Question :

$$[a] (1) c \quad (2) a \quad (3) b$$

$$[b] \therefore Y \text{ is the midpoint of } \overline{AC} \therefore \overline{MY} \perp \overline{AC}$$

$$\therefore \overline{MX} \perp \overline{AB}, MX = MY \therefore AB = AC$$

$$\therefore \triangle ABC \text{ is an isosceles triangle.} \quad (\text{Q.E.D.})$$

Second Question :

$$[a] (1) c \quad (2) a \quad (3) c$$

$$[b] \therefore \overline{EF} \parallel \overline{BC}, \overline{AC} \text{ is a transversal}$$

$$\therefore m(\angle AFE) = m(\angle ACB) \text{ (corresponding angles)}$$

$$\therefore m(\angle DAB) \text{ (tangency)}$$

$$= m(\angle ACB) \text{ (inscribed)}$$

$$\therefore m(\angle AFE) = m(\angle EAD)$$

$$\therefore \overline{AD} \text{ is a tangent to the circle passes through } \triangle AEF \quad (\text{Q.E.D.})$$

Third Question :

$$[a] (1) c \quad (2) a \quad (3) c$$

$$[b] \therefore ABCD \text{ is a cyclic quadrilateral.}$$

$$\therefore m(\angle BAC) = m(\angle BDC)$$

(two angles drawn on $\overline{BC}$ and on one side of it)

$$\therefore \frac{1}{2} m(\angle BAC) = \frac{1}{2} m(\angle BDC)$$

$$\therefore m(\angle XAY) = m(\angle XDY)$$

two angles drawn on $\overline{XY}$ and on one side of it

$$\therefore AXYD \text{ is a cyclic quadrilateral.} \quad (\text{Q.E.D.})$$

Fourth Question :

$$[a] \therefore \overline{AD}, \overline{AF} \text{ are tangents to the circle M}$$

$$\therefore AD = AF = 4 \text{ cm.}$$

$$\therefore \overline{BD}, \overline{BE} \text{ are tangents to the circle M}$$

$$\therefore BD = BE = 3 \text{ cm.}$$

$$\therefore \overline{CE}, \overline{CF} \text{ are tangents to the circle M}$$

$$\therefore CE = CF = 5 \text{ cm.}$$

$$\therefore \text{The perimeter of } \triangle ABC$$

$$= 4 + 4 + 5 + 5 + 3 + 3 = 24 \text{ cm.} \quad (\text{The req.})$$

$$\begin{aligned}
 \text{[b]} \because \overline{DE} \parallel \overline{XY} & \quad \therefore m(\widehat{DX}) = m(\widehat{EY}) \\
 \therefore m(\angle DZX) = m(\angle EZY) \\
 \text{By adding } m(\angle XZY) \text{ to both sides} \\
 \therefore m(\angle DZY) = m(\angle XZE) & \quad (\text{Q.E.D.})
 \end{aligned}$$

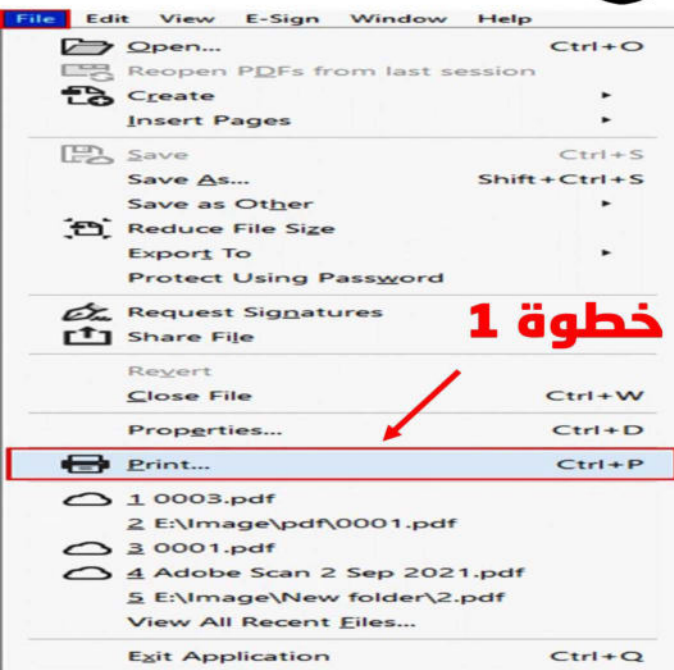
Fifth Question :

$$\begin{aligned}
 \text{[a] In } \triangle AMB : \\
 \because MA = MB = r \\
 \therefore m(\angle MAB) = m(\angle MBA) = 50^\circ \\
 \therefore m(\angle AMB) = 180^\circ - (50^\circ + 50^\circ) = 80^\circ \\
 \therefore m(\angle ACB) = \frac{1}{2} m(\angle AMB) = \frac{1}{2} \times 80^\circ = 40^\circ \\
 (\text{inscribed and central angles subtended by } \widehat{AB}) \\
 (\text{The req.})
 \end{aligned}$$

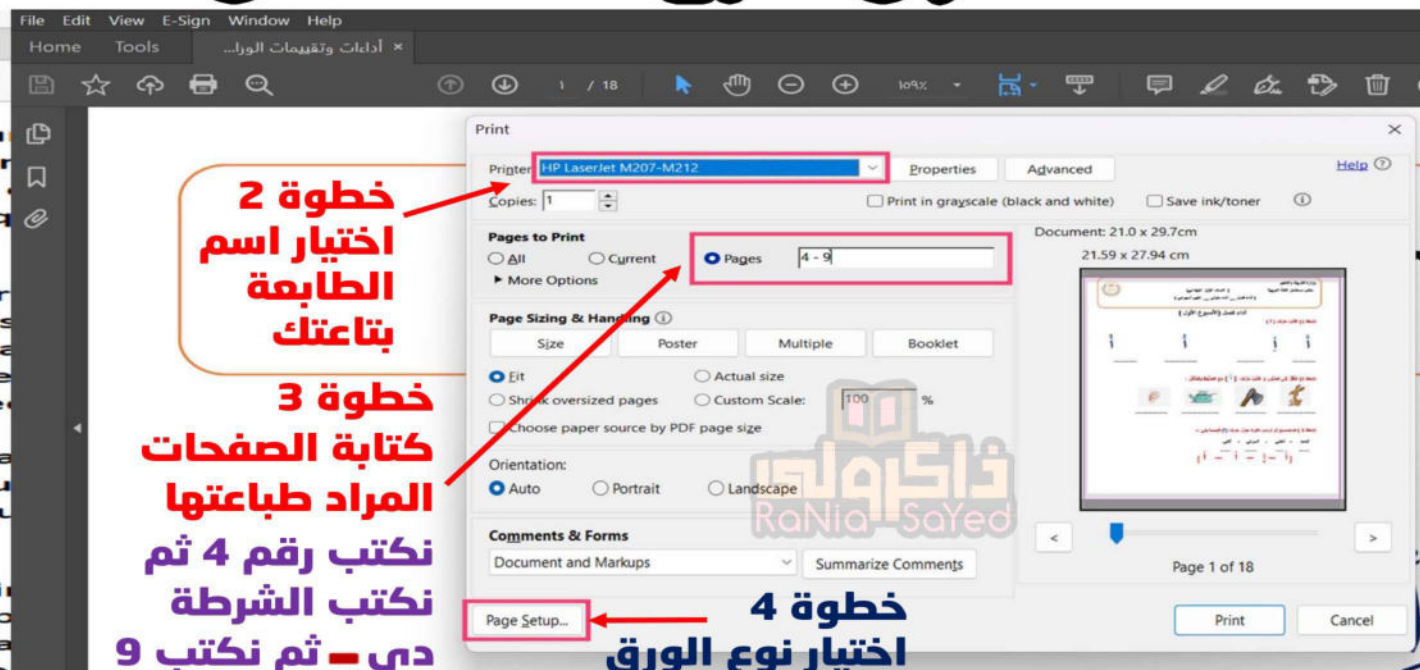
$$\begin{aligned}
 \text{[b]} \because m(\angle DEB) &= \frac{1}{2} [m(\widehat{BD}) + m(\widehat{AC})] \\
 \therefore 90^\circ &= \frac{1}{2} [m(\widehat{BD}) + 70^\circ] \\
 \therefore 180^\circ &= m(\widehat{BD}) + 70^\circ \\
 \therefore m(\widehat{BD}) &= 180^\circ - 70^\circ = 110^\circ \quad (\text{The req.})
 \end{aligned}$$

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



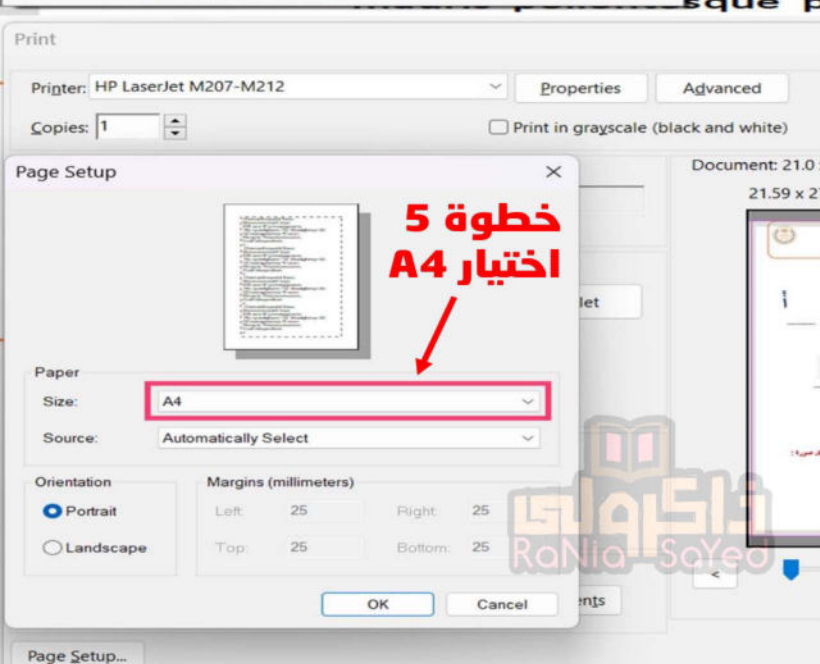
خطوة 1



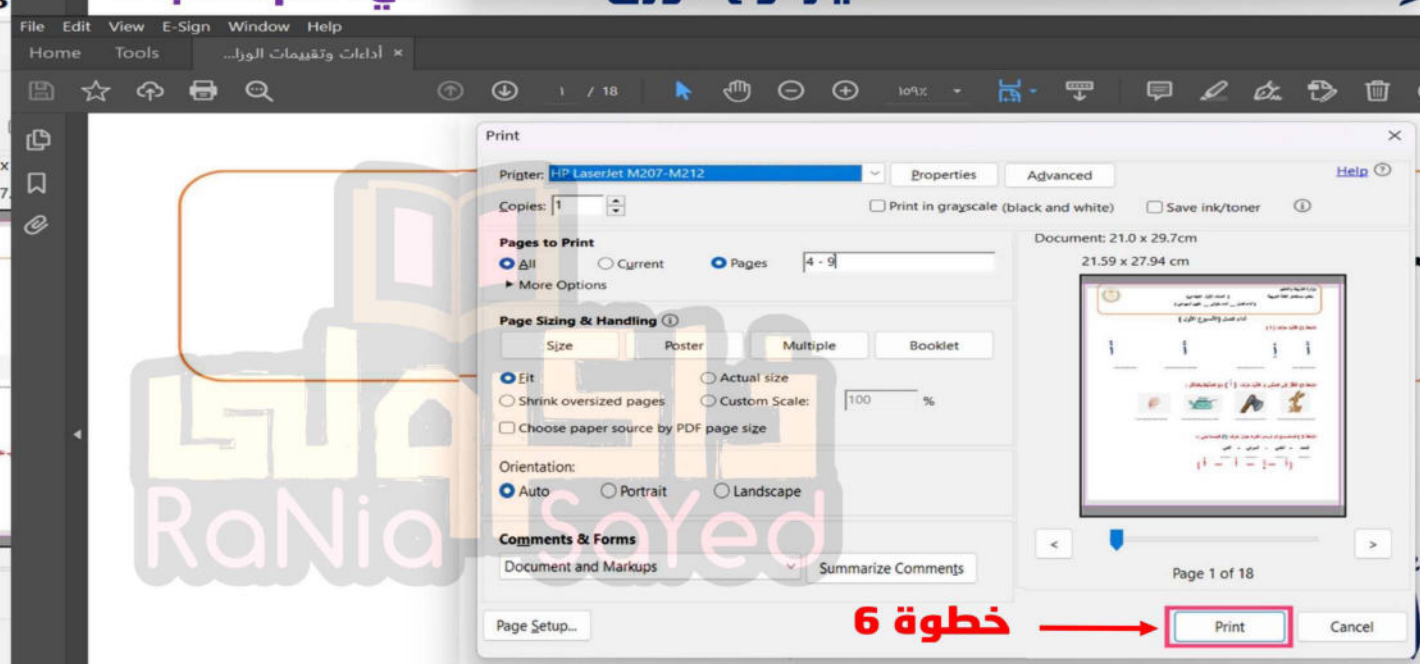
خطوة 2
اختيار اسم
الطابعة
بتاعتك

خطوة 3
كتابة الصفحات
المراد طباعتها
نكتب رقم 4 ثم
نكتب الشرطة
دي - ثم نكتب 9

خطوة 4
اختيار نوع الورق



خطوة 5
اختيار A4



خطوة 6